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PREFACE

No Department of State touches the everyday life of the nation more closely than the Post Office. Most of us use it daily, but apart from those engaged in its administration there are relatively few who have any detailed knowledge of the problems with which it has to deal, or the machinery by which it is carried on. This brief volume does not pretend to be a comprehensive history; still less is it a scientific treatise on administration. It aims at presenting in terms intelligible to the layman an account of the development of the Post Office services and a description of the functions which the Department exercises in the sphere of national and international communications.

The field is too extensive for anything but a superficial survey; in fact, almost every chapter could readily be expanded into a volume in itself. I have therefore preferred to concentrate for the most part upon the principal Post Office services, their history and the broad questions of policy and administration which they involve. But there are other aspects of the Post Office which to some readers may be of greater interest and are of no less importance. For example, I have scarcely touched upon the domain of electrical engineering, to which the more modern services of the Post Office—the telegraphs, the telephones and wireless—owe their inception and progress. The evolution of these

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services on the technical side is an impressive story which requires an expert in the mysteries of electrical science to unfold. For students with a leaning in this direction a choice of excellent textbooks is available.

A Civil Servant must walk warily in writing of the affairs of his own Department. I have not felt precluded from free comment upon matters which have passed into history, but I have endeavoured to avoid questions of current controversy or at any rate to be sparing with criticism upon them. Such opinions as are expressed are my own and must not be assumed to carry any other authority.


I am indebted to the Postmaster-General for permission to publish the book and to many friends and colleagues at the Post Office, who would probably prefer to remain anonymous, for advice and assistance and for a store of information which could be gleaned with difficulty, if at all, from official records.

G. E. P. M.

April, 1927.

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THE POST OFFICE

Chapter I

THE EARLY HISTORY OF THE POSTS

I. Inland Posts

THE origin of the Postal Service may be said to date from the beginning of the sixteenth century, though in the reign of King John, or possibly even earlier, an establishment of messengers, analogous to the "King's Messengers" of the present day, was maintained for the conveyance of the King's despatches and the private correspondence of the Court both within the realm and across the seas. In the "Household and Wardrobe" accounts of Henry III, some of which are still extant, the payments for these messengers formed a considerable item.

About 1512 Sir Brian Tuke, the first "Master of the Posts" of whom we have any record, was appointed at a yearly salary of £66 13s. 4d. On the regular post-roads relays of horses were maintained at the King's charge, but on other roads the townships were under an obligation to provide horses for persons travelling on the King's business, whether carrying letters or not, and it was the duty of the Master of the Posts to keep them up to the mark. Hence began the close connection between the conveyance of travellers and mails. Though established for the Sovereign's purposes, the posts were available, by arrangement with the postmen, for

private correspondence. And private individuals, by pretending that they were travelling on the King's service, were able to obtain horses which otherwise would have been denied them. The regular posts were few and were periodically suspended; even at the end of the sixteenth century they were only four in number—(1) the Courte to Barwicke (the post to Scotland), (2) the Courte to Beaumoris (the post to Ireland), (3) the Courte to Dover, and (4) the Courte to Plymouth. They were slow and unreliable; the postmen's wages were frequently left unpaid and their efficiency was probably not increased by an edict of Queen Elizabeth that they should be discharged unless they were willing to serve for half their previous wages. Of the four regular posts, the post to Dover was by far the most important. The colony of Flemish cloth-manufacturers and other foreign merchants having business relations with the Continent required a quick and reliable system of communication, and the leisurely and haphazard methods of the Royal posts early in the sixteenth century led to the establishment of private posts, known as the "Strangers'" or "Foreigners'" Post and the "Merchant Adventurers'" Post, which were tolerated and in fact recognised by the State.

The first serious attempt to establish the monopoly of the Royal posts was contained in a Proclamation of Queen Elizabeth in 1591, which prohibited anyone, except the Postmaster-General and his deputies, from conveying letters or packets into or out of the realm. It is significant that the

Proclamation applied only to the foreign post, i.e. that travelling through the county of Kent. It was not until 1609 that the monopoly was extended by a further Proclamation to include all roads on which the King's posts had been established.

The original object of the State monopoly was not so much to extinguish competition as to give the Government of the time access to the correspondence of suspected persons, and particularly to letters passing between England and foreign parts. Even before the monopoly was definitely asserted, Wolsey openly intercepted despatches written by the Ambassador of the Emperor Charles V; and during the reign of Charles I the journals of the two Houses of Parliament show that the foreign mails, both inward and outward, were stopped for whole weeks together, and Committees were appointed to open and read the letters. On one occasion the opening of the correspondence of the Venetian Ambassador provoked a vigorous protest, which necessitated the dispatch of a Committee of Peers to tender an apology. The preamble to Cromwell's Act of 1657, which established a General Post Office, claims as one of its advantages that it was "the best means of discovering and preventing many dangerous and wicked designs which have been and are daily contrived against the peace and welfare of this Commonwealth, the intelligence whereof cannot well be communicated but by letter of escript." Under the Commonwealth the frequent opening and detention of letters produced a reaction, and after the Restoration a Royal Proclamation declared that no letter should be opened, except under the

express warrant of a Secretary of State. This prohibition was given statutory force by the Act of 1711 and is incorporated in the Post Office Act of the present day.

As time went on, the monopoly became more and more necessary to protect the Post Office Revenue. Several attempts were openly made to establish rival posts at lower rates in defiance of the law and were only extinguished by proceedings in the Courts. But while the Post Office could deal effectively with organised competition, it was powerless to prevent promiscuous evasion. High postage rates and a poor service gave ample stimulus to illicit letter-carrying, and it was not until the institution of penny postage in 1840 that attempts to circumvent the monopoly virtually ceased.

An ingenious attempt to improve the posts without dipping deeper into the King's purse was made by a Proclamation of 1603, which conferred on the postmasters the exclusive right of letting horses to travellers, a monopoly which they enjoyed for close upon 180 years. The primary object was no doubt to improve the supply and quality of post-horses, but it was probably also expected that the postmasters, who retained the hiring charges, would be content to serve for lower wages. But whether owing to a scarcity of travellers or to wages being heavily in arrear, the condition of the posts went from bad to worse. The postmasters would not, or could not, keep sufficient horses and the horse-posts were gradually replaced by foot-posts, making on an average no more than 16 to 18 miles a day. To send a letter from London to Scotland or Ireland

and to obtain a reply was a matter of fully two months.

No serious effort at improvement was made until the appearance of Thomas Witherings, the first of the postal reformers. Witherings held the office, which had been created by a Patent of James I, of "Postmaster of England for foreign parts out of the King's Dominions." In 1635 he was placed in charge of the Inland Posts and the Inland and Foreign Post Offices were again amalgamated. His first aim was to make the posts self-supporting, which he foresaw could be done by making them efficient and by no other means. With a view to attracting the patronage of the public, he instituted for the first time a fixed scale of postage rates, graduated by distance, which he calculated would cover the costs of sufficient relays of post-horses. He established a central Post Office in the City of London, from which the main posts to the principal towns of the Kingdom started. The Proclamation of 1635 emphasises Scotland, for it commands "Thomas Witherings, Esq. His Majesties Postmaster of England for foreign parts to settle a running post or two, to run, night and day, between Edinburgh in Scotland and the City of London, to go thither and come back again in six days." In connection with the main posts were branch posts, either on foot or horseback according to distance, to the smaller towns. The main posts were to travel night and day and were to work to a definite time-table. The improvement in speed was enormous; Edinburgh and Plymouth were reached in

three or four days, while previously the post had taken almost as many weeks.

Witherings' term of office fell in the middle of a prolonged conflict between various Patent-holders, their heirs and assigns, who aspired to the office of Postmaster, basing their claims upon the Patents granted in the days of James I. The monopoly which he held, while profitable and therefore acceptable to the King, was for this reason all the more obnoxious to Parliament, and it was not long before he fell a victim to the intrigues of the time and was removed from office. But his tenure was long enough to enable him to see the successful working of his system, the main features of which continue to the present day.

Witherings was commonly believed not only to have extinguished the loss on the posts but to have accumulated a large fortune out of them for himself. However this may be, in his successor's regime it began to dawn on the Council of State that the posts might be made a source of revenue, and in 1650 the policy of farming was adopted. The general farm of the posts came to an end in 1677, but as we shall see, some of the local posts were farmed until the middle of the eighteenth century.

Hitherto the Post Office had been governed by Proclamations and Orders in Council which included several provisions of doubtful legal validity. A change of some importance took place in 1657, when the Post Office obtained a more secure foundation by an Act of Cromwell's Second Parliament entitled "an Act for settling the postage of

England, Scotland and Ireland." A general office, to be called the Post Office of England, was to be established for the receipt and dispatch of letters; the monopoly both of carrying letters and hiring post horses was retained, and a scale of postage was given legal sanction. At the Restoration the statutes of the Protectorate were repudiated, and Cromwell's postage Act was re-enacted with insignificant changes in 1660.

At this time the country was served by six main post roads—the North Road to Edinburgh, the West Road to Plymouth, the Chester or Holyhead Road and the Roads to Bristol, Dover and Norwich. On the Dover Road the mails left daily and on the others two or three times a week. Other places were served by branch posts working out of the main roads, and letters between intermediate towns on the main roads were carried by what were known as the by-posts. But there were no cross-posts giving direct connections between places on different main roads, and correspondence from a town on one road to a town on another had to pass through London and pay postage calculated on the distance via London. Strangely enough, there was no local post within London itself, and a letter from one part of London to another had to be carried by the writer or a private messenger. As in these days the houses were not numbered and were as a rule recognised only by the signs they bore, the difficulties of a messenger who was not familiar with the locality may easily be imagined.

Frequent attempts were made to establish rival

posts in all parts of the country, the most important being a private post between London and Edinburgh, inaugurated by the City of London in 1649, which was promptly suppressed by Parliament. But in 1680 a more formidable and revolutionary rival entered the field. William Dockwra, a London merchant, was so impressed with the want of postal facilities within the metropolis that he decided to establish with his own resources a London Penny Post on an ambitious scale. He opened between four and five hundred receiving offices, at which messengers called hourly and conveyed the correspondence to seven sorting offices between which London was divided. From the sorting offices deliveries were made, ranging from twelve daily in parts of the central area to four on the outskirts. The postage was uniformly one penny, which carried insurance against loss up to £10; and parcels up to 1 lb. were accepted as well as letters. Dockwra's post extended to places ten to fifteen miles from London, for which he provided a daily collection and delivery and charged an extra penny on each letter. As a check on his messengers he also introduced postmarks bearing the hour at which the letter was received. The penny post naturally came into conflict with the private porters and other vested interests and was even denounced by some fanatics as a "Popish contrivance." For some time it was worked at a loss, which for the most part fell upon Dockwra himself; so long as no profits were made, the authorities apparently ignored it, but when handsome returns seemed in prospect the Duke of York, upon whom the Postal

Revenue had been settled, stepped in and ousted Dockwra by proceedings in the Courts for infringement of the State monopoly. The penny post was then taken over by the Postmaster-General, but its administration remained separate from and characteristically out of touch with that of the General Post. Both in conception and in the details of his organisation Dockwra was far in advance of his time, and it is a remarkable achievement to have provided London 250 years ago with a postal service which in some features at any rate compares favourably with that of the present day.

In 1691 two Postmasters-General were appointed to hold office jointly, an arrangement which continued, except for a few brief intervals, until 1823. And in 1695 by an Act of the Scottish Parliament a Postmaster-General for Scotland was created and vested with a monopoly of the posts in Scotland. But the separation was shortlived, for after the Union of England and Scotland the two Post Offices were reunited by the Act of 1711. In the same way the Irish Post Office was given a separate existence under its own Postmaster-General in 1784, but innumerable difficulties were the result and the offices were again amalgamated in 1831. So they remained until the Post Office in Southern Ireland was transferred to the Irish Free State in 1922.

At the close of the seventeenth century the flagrant evasions of the Post Office monopoly were causing serious anxiety. Carriers, stage coach drivers and street loafers more or less openly defied

the law and the Post Office was powerless to stop them. One obvious remedy was to improve and cheapen the State posts. But the Postmasters-General were debarred by statute from lowering the rates and had to be content with some minor reforms. For the first time a number of cross-posts were established, beginning with a direct post between Bristol and Exeter, which saved the circuitous journey via London. And the Post Offices in several large areas, in some cases comprising three or four counties, were grouped and let out to farm. The farmers in their own interests extended and improved the local arrangements and the experiment, as far as it went, was a success.

But any chance there may have been of stamping out the illegal carrying of letters disappeared with the Act of 1711. This Act imposed substantial increases in the rates of postage. Revenue had to be raised to finance the war with France, and the Postmasters-General had no option but to acquiesce in the demands of the Exchequer. The higher rates naturally gave a stimulus to competition and the Post Office found itself unable either to prevent the diversion of its legitimate business to other channels or to collect from the postmasters the revenue on that which it retained. The Act, which marks an important stage in Post Office history, also legalised the London Penny Post, the cross-posts and other reforms which had been in operation for years without statutory authority. And it marked a new departure in prohibiting any Post Office official from meddling in politics, including

the Postmasters-General themselves, who were probably the only people affected by it.

Fortunately at the critical moment a remarkable figure in the personage of Ralph Allen, then Postmaster of Bath, came to the rescue. Allen was convinced that with enterprising management the cross and by-posts could be made to yield a much higher profit, and he offered to farm them at a rental 50 per cent. higher than the gross receipts of the previous year. He was given a seven years' contract in 1720, which was successively renewed for similar periods at steadily rising rentals until his death forty-four years later. During his tenure he reorganised the cross-posts on a much more liberal scale, and in his later contracts he undertook at his own expense to convert from tri-weekly to daily the posts on many of the main roads leading out of London. Allen's success was largely due to the strict supervision which he exercised over the postmasters and their accounts and to the intelligent use of statistics of the postal correspondence between different towns. But it is also a striking example of the maxim that improved postal communication brings its own reward. He built up a postal system far in advance of that which he inherited; he contributed a constantly increasing revenue to the State and incidentally he is credited with having made a fortune of £500,000 for himself. It is an obvious criticism that the Post Office could and should have carried out these reforms itself instead of transferring its functions to an agent. Feeble and stagnant though the Post Office administration at this time un-

doubtedly was, the blame cannot be attributed wholly to the Postmasters-General and their staff. The Treasury, in dire need of money, kept a very tight hold over them and appears to have stonewalled as long as possible every proposal for increased expenditure without much regard to its merits or to the revenue which it would earn. Consequently the only practicable means of developing the service was to let it out to farm and to leave the farmer to bear the costs and to reap the harvest of the improvements which he carried out.

Although under Allen's management the conveyance of letters between town and town had been immensely improved, London, Edinburgh and Dublin were the only cities within which there was a recognised machinery for delivery. Elsewhere it was left to the local postmaster to deliver the correspondence himself or to employ his own messengers to do so; in some towns delivery was free while in others the postmaster charged very much what he liked. About 1772 a revolt against these charges came to a head and a series of actions were taken to the Courts, the result of which was to establish the principle that the Post Office were bound to give a house-to-house delivery free of charge within the area of the post town. The Postmasters-General were aghast; for some time they were successful in restricting the free delivery required by the law to the towns which actually demanded it, but ultimately it had to become universal. Large numbers of letter-carriers were appointed, and they were the forerunners of the modern postman.

About the same time an agitation was gathering momentum against the slowness and want of security of the posts as compared with the stage-coaches, which were then plying on most of the important roads. The mails were carried by post-boys on horseback and made about four or five miles an hour, while the stage-coach averaged nearly twice as much; and the mails were easy prey to robbery by the most amateur of footpads. The inevitable result was that the stage-coaches were surreptitiously building up a flourishing postal business at the expense of the Post Office revenue. The glaring contrast between the stage-coach and the leisurely habits of the post-boys suggested to one John Palmer, an enterprising theatre proprietor of Bath, that the substitution of coaches for the post-boys would accelerate and safeguard the mails and thereby recover the traffic which the Post Office had lost. He described the post-boy of the day as an "idle boy without character, mounted on a worn-out hack, who so far from being able to defend himself against a robber, was more likely to be in league with one." Palmer proposed a scheme for an organisation of mail-coaches, which met with a lukewarm reception at the Post Office; but he was fortunately able to enlist the sympathy of Mr. Pitt, who was Chancellor of the Exchequer at the time, and his proposals were ultimately adopted. As the result he became Comptroller-General of the Post Office. The coaches were to be run by contract and to maintain an average speed of eight to nine miles an hour; they were to work to a fixed time-table, so arranged that

they all left London and returned to London at the same hour, thus avoiding delays in the subsequent delivery of correspondence; in addition to the driver provided by the contractor they were to carry a Post Office guard, both being heavily armed.

The first mail-coach ran on the London-Bristol road in 1784, and other routes followed in quick succession. When the scheme was fully working there were forty-two mail-coach routes; London to Holyhead took twenty-seven hours, to Falmouth twenty-nine hours, to Edinburgh forty-three hours and to Thurso 108 hours. The contractor was paid at first a fee of threepence a mile, which was gradually reduced and for some years was no more than one penny a mile. The mail-coach was supreme for roughly fifty years until it was superseded in its turn by the railway train. Palmer's confidence had been abundantly justified. The speeds he had reckoned on were attained and in time exceeded. Robberies were rare, and it was found that the coach services cost considerably less than those of the post-horses which they replaced. The first rail-borne mail was carried between Liverpool and Manchester in November, 1830, but it was some years before the use of the railway became at all general. The last of the London mail-coaches arrived from Norwich and Newmarket on January 6th, 1846.

The Napoleonic Wars brought a succession of demands upon the Post Office for additional revenue, which had to be met by repeated increases of rates. The most important was the Act of 1801 which

swept away the London Penny Post after an existence of 120 years and replaced it by what came to be known as the Twopenny Post. Four years later the limits of the Twopenny Post were restricted to the General Post delivery, and for letters crossing these narrow bounds the Twopenny Post became a Threepenny Post. Postage rates reached their zenith in 1812. The mileage scale was then so steep that the charge on a single-sheet letter from London to Liverpool, Plymouth or York was 11*d*. More than a century earlier the postage would have been 3*d*. In addition to the postage there were varying charges on letters for addresses outside the narrow limits of the free delivery; and as the rate was levied upon the road mileage, it worked out on the circuitous routes which cross-country letters had to travel at much more than the "crow-fly" distance would warrant. In fact direct posts were frequently refused because of the loss of postage which they would entail. Nowadays it is difficult to conceive how the public can have tolerated a system under which the postage rates were not only unconscionably high but varied to every destination and could seldom be assessed or even predicted until the letter reached the point of delivery.

These exorbitant and complicated rates afforded Rowland Hill his opportunity and give us some idea both of the problem confronting him and of the revolution which a uniform penny rate, irrespective of distance, involved. The immense blessing of cheap postage has obscured other important changes which were essential features of the Rowland

Hill scheme. For more than two hundred years letters containing a single sheet were charged at the single rate and letters containing two sheets at double rate.* This necessitated every letter being examined by a strong light in order to determine its contents and the rate at which it should be charged. The rate having been decided, the mileage scale had to be applied in order to assess the total postage, which even then was exclusive of delivery charges. The prepayment of postage was the exception rather than the rule and was not encouraged by the Post Office. It was one of the duties of the letter-carriers to collect the postage due from the addressee, and it was apparently felt that in the absence of a charge to be collected and accounted for there would be no guarantee for the delivery of the letter. By establishing a scale independent of distance and governed by weight only, the complicated operations of assessment and collection which occupied a considerable staff and delayed the deliveries, were swept away. Only by the simple process of prepayment by stamps could the enormous volume of correspondence which resulted from penny postage be handled within reasonable limits of time. The practical details of the Rowland Hill scheme, which have been adopted by nearly every civilised country, were an essential complement to cheap postage and to postal development on the scale which he envisaged.

* A letter enclosed in an envelope counted as a double-rate letter.

2. Foreign Posts

As we have seen, in the days of Elizabeth the London merchants conducted an extensive correspondence with the Continent, but they made their own arrangements for transmission and clung to them tenaciously even after the Crown's monopoly had been asserted. In the sixteenth century, foreign letters which came into the hands of the Post Office were entrusted to private ships for conveyance across the Channel, and it was probably well on in the seventeenth century before the Post Office packet service came into being. Dover and Holyhead were the earliest packet ports, and in 1686 a service to Holland was opened from Harwich, followed a few years later by a service from Falmouth to the Spanish peninsula. The eighteenth century brought further extensions. Falmouth became the principal packet station, the number and size of the packets were increased, and mail services to the West Indies, America and other distant places were instituted.

But a large proportion of the foreign correspondence continued to be carried by ordinary merchant vessels. The Act of 1660 required ship-letters, as they were called, to be handed over to the Postmaster at the port of arrival for dispatch to their destinations by post. To give the masters of ships some inducement to comply with the law, the practice grew up of paying them a fee of one penny for each letter. Statutory authority for the payment, which is still in force, was obtained in the Act of 1711,

The administration of the packet service with the means of communication then available would have been troublesome enough in normal times, but the wars in which we were engaged during the eighteenth century aggravated the difficulties. It is abundantly clear from contemporary evidence that the Postmasters-General were quite unable to control either their local agents or the masters of the ships, and the opinion expressed by a Committee of Inquiry in 1788 that the management of the packets had become "an unbounded source of expense and speculation" was scarcely an overstatement. The packets were either owned by the Post Office or, more generally, hired by contract from the commanders who ran them. It was not unusual for officials of the Post Office to be part owners in the packets hired by their Department, and the Secretary to the Post Office was the fortunate recipient of a commission of $2\frac{1}{2}$ per cent. on the gross expenditure, which with other perquisites from the packet service brought him in between 1770 and 1787 nearly £50,000. It is not surprising that the expenditure on the packets rose year by year until it became a public scandal.

The commanders were prohibited from carrying goods or passengers except under official passes with the sanction of the Secretary of State. The articles confided to the packets under authority seem to have gone considerably beyond the accepted definition of mails. The agents' books record among other consignments "15 couple of hounds going to the King of the Romans with a free pass," "some parcels of cloth for the Clothing Colonels

in My Lord North's and My Lord Grey's Regiments," and "two servant maids going as laundresses to My Lord Ambassador Methuen." Indeed, the rule against carrying goods and passengers was generally ignored. The captains indulged in extensive smuggling, for which they had unrivalled opportunities, and there were constant fracas with the Customs authorities, leading eventually to the seizure and condemnation in Court of some of the Post Office packets for carrying contraband. The Postmasters-General supported the captains, who were the owners of the ships, on the curious ground that no captain "of real worth and character" would remain in the service, if the law against smuggling was enforced. It was not an unusual occurrence for a packet to arrive days and even weeks behind time, and the explanation of the captain that he had been driven by bad weather several hundred miles to windward of his proper port seems to have occasioned no surprise at headquarters.

During the wars of the eighteenth century and until the end of the struggle with Napoleon the packet boats ran a daily risk of capture or destruction at the hands of privateers or the enemy's warships. The commanders were instructed that their primary duty was to safeguard the mails, that they should outsail an enemy rather than engage him, and that if in danger of being overpowered the mails were to be weighted and sunk. These orders had little effect. The packets, especially those carrying bullion, were well armed, and the thirst for adventure, aided no doubt by the

lure of prize money, led to frequent engagements. The archives of the Post Office abound with records of these adventures, and it is clear that, whatever the other shortcomings of the packets may have been, as Navy auxiliaries they usually gave a good account of themselves. But the losses at times were heavy, and it is not surprising to find the merchants petitioning that more powerful ships should be employed. On the other hand, the Postmasters-General were considering whether faster ships with no armament would not in the long run be a better investment.

Notwithstanding the expansion of the packet service and the opening of new packet routes, the practice of sending letters by private ships continued to flourish. Most of the coffee houses in the City of London openly kept bags for the collection of letters to be forwarded by merchant ships, and it was obviously impossible to terminate a system, under which most of the foreign correspondence of the country was carried on, until an effective alternative had been provided. The Post Office therefore decided to control the traffic which they could not stop, and in 1799 the Ship Letter Act was passed legalising the dispatch and receipt of letters in bags by ships other than packets, and fixing the rates to be paid to the owners. Letters carried out of the country in private ships are still outside the Postmaster-General's monopoly. An Act of 1815 went a step further and made it compulsory upon private ships to carry mails when required to do so by the Post Office, and this provision remains in force.

The first use of steamships for mail purposes was on the Holyhead-Dublin route. A private company had already started a steamer service and offered to take the mails, but for some obscure reason the Post Office determined to provide and run their own ships. Two steamers were accordingly built in 1821 and stationed at Holyhead, and in the following year steamships were placed at Dover and later at other ports. The advent of steam effected a great improvement in the speed and regularity of the mail service, but financially the venture was disastrous. The Post Office was severely criticised by the Revenue Commissioners for failing to take advantage of reasonable offers to carry the mails by the private companies running on the same routes, and in 1831 the principle of inviting shipping companies to tender for mail contracts was introduced.

In 1837 a scheme prepared by the Admiralty for utilising the Post Office packets and their crews as war reserves was adopted by the Government. It was felt that under these conditions the Admiralty was the proper Department to manage the service, and in spite of Post Office opposition the control of the ships was transferred by statute. But the reign of the Admiralty was short. The naval reserve scheme fell through, and with the rapid expansion of the mercantile marine it became patent that the mails could be conveyed by the regular ocean liners more efficiently and much more economically than by a Government service maintained solely for the purpose. The *raison d'être* of Admiralty management having disappeared and the contract

work having become more arduous every year, it was decided to retransfer the service to the Post Office as from January 1st, 1860. By that date the Government packets had disappeared and the modern policy of relying entirely upon the mercantile marine had been established.

Chapter II

POST OFFICE FINANCE

As we have seen, the posts in their early days were maintained wholly at the expense of the Sovereign, the receipts for the conveyance of private letters being apparently the legitimate perquisites of the postmasters. In 1609 the posts cost the Crown £3,400, but the assertion of the State monopoly, followed in 1635 by the institution and systematic collection of a definite scale of charges upon private correspondence, gradually converted the loss into a profit. This unexpected prosperity suggested the policy of farming the posts, which was adopted by Cromwell in 1650 and continued until 1677, at a rental starting at £5,000 per annum and rising to £43,000. In 1663 the Post Office revenue was settled on the Duke of York but reverted to the Sovereign on his accession in 1685 and formed part of the hereditary revenues of the Crown until the accession of George III. The hereditary revenues were then surrendered in exchange for a fixed Civil List granted by Parliament at the commencement of each reign, and the Post Office net revenue was paid into the Consolidated Fund.

While the Post Office revenues were at the disposal of the Sovereign, they had been charged with a number of pensions, some of them granted in perpetuity to persons to whom the Crown con-

sidered itself under obligations. At the end of the seventeenth century these pensions aggregated over £20,000 per annum, about one-third of the net revenue. Perhaps the most notable was a pension granted by Charles II to Barbara Villiers, Duchess of Cleveland, and her successors, the Dukes of Grafton, which was paid out of Post Office revenues until 1856, when it was commuted for £91,000.

Even before its formal surrender by the Crown in 1760, the Post Office revenue was not entirely withdrawn from Parliamentary control. For instance, when money was required to finance the War of the Spanish Succession, the postage rates were heavily increased by the Post Office Act of 1711, and it was enacted that a weekly sum of £700, which apparently represented the estimated initial yield of the higher charges, should be paid into the Exchequer. As it turned out, the realised increase was considerably less and the Crown was the loser.

During the Napoleonic wars postage rates were repeatedly raised to provide funds for an impoverished Exchequer, and by 1840, when the Rowland Hill reforms took effect, the Post Office revenue had reached £2,390,000, of which £1,633,000 was profit. It is calculated that at this time the average postage on a single sheet was about $8\frac{3}{4}d.$, so that the reduction to a uniform penny rate necessarily involved the Exchequer in a large sacrifice. It has become almost an accepted tradition among the advocates of cheap postage that the penny post was an immediate boon to the

Exchequer as it was to the public. But, in fact, this was far from the case. The loss of revenue was estimated at £300,000 in the first year but was actually about £1,100,000, and in spite of the growth of correspondence which the low rate yielded, it was not until 1874 that the postal net revenue regained the level of 1839.

The introduction of cheap postage afforded a golden opportunity, which was not allowed to slip, of putting an end to the pernicious system of franking letters and newspapers free of postage. Instituted in the time of Cromwell for correspondence passing to and from Peers, Members of Parliament and high officers of State, for more than a century it had been a growing and notorious scandal. Members of Parliament provided their friends and constituents with franked envelopes on a lavish scale, the officials of the Post Office and other Government Departments supplemented their exiguous salaries by the same means, and it was common knowledge that franks could be and were forged with the slenderest risk of detection. Periodical attempts were made to check the abuse by stiffening up the regulations, but they were no match for the ingenuity of those who were engaged in what had become a regular traffic. By 1840 the letters and newspapers passing free under franks had reached six millions a year. Considering the high rates of postage and the relatively small volume of correspondence, this represented a serious inroad upon the Post Office revenue. With the abolition of franks the right of sending letters free of postage has been strictly limited to correspondence emanating

from or addressed to Government Departments or their local officials on the service of the State, and the existing system is believed to be sufficiently watertight to confine evasions within negligible limits.

The postal revolution associated with Sir Rowland Hill ushered in an era of Post Office expansion, which met with no check until the outbreak of the Great War, three-quarters of a century later. Not the least important consequence of the Rowland Hill reforms was that they marked a definite change in the position of the Post Office from being primarily a medium of taxation to being primarily an instrument of popular communication. The penny letter grew in popularity year by year and carried on its back a variety of new and unremunerative services, notwithstanding which the Postal Service was able to contribute a steadily growing revenue to the Exchequer.

For a good many years after 1840 the Post Office wisely refrained from any further financial reforms, and, apart from a few minor tariff concessions, devoted its resources to the improvement of its Postal Services and to recovering by the automatic expansion of its business the revenue which the introduction of the penny post had sacrificed. The next considerable changes took place in 1870, which saw the State purchase of the telegraphs, the introduction of the halfpenny postcard and the reduction to a halfpenny of the newspaper rate and the minimum of the book post, as the printed paper rate was then called. The Postal Union Congress of 1874 resulted in the adoption of a

uniform rate of $2\frac{1}{2}d.$ for letters addressed to the continent of Europe in place of the high and varying changes previously in force, and in 1891 the $2\frac{1}{2}d.$ rate was extended to India and the Colonies, and in the following year to extra-European countries. In 1881 came the postal order, and the institution of the parcel post in 1883 brought a large addition to the Post Office revenue but an even larger increase in its expenditure. In 1885 the bold and, as it turned out, financially disastrous step was taken of launching the sixpenny telegram.

Queen Victoria's Diamond Jubilee in 1897 was marked by a number of concessions in the inland service, the most important being the extension to four ounces of the weight which would pass for the initial rate of a penny. Soon after came the inauguration of the Imperial Penny Post, which was subsequently extended to the United States.

The purchase of the Trunk Telephone system in 1896, while it yielded a relatively small revenue at the time, was the first important step in the establishment of the Post Office telephone service. The opening of the London service in 1902 marked a further stage in development, and with the transfer of the National Company's local system in 1912 the telephone took its place as one of the three principal Post Office services.

The Great War opened a new epoch of high Post Office rates with their natural consequence—a temporary setback in most branches of Post Office business. In 1915 the sixpenny telegram gave way

to a ninepenny minimum, and some of the telephone charges and the less important postal rates were also increased. But as wages and other costs continued to rise with increasing rapidity in the later years of the war, more drastic measures became inevitable, and in 1918 the Government reluctantly decided to abandon penny postage. The minimum rate for an ordinary letter was raised to $1\frac{1}{2}d.$ and for a postcard to $1d.$ In 1920 costs were still on the upward trend and the letter rate was increased to $2d.$ and the minimum of the newspaper post to $1d.$ Telegraph charges were raised to $1d.$ per word with a minimum of $1s.$ a telegram. In the following year the postcard went up to $1\frac{1}{2}d.$ and the minimum of the printed paper rate to $1d.$ Parcel post charges and most of the subsidiary rates were also from 50 per cent. to 100 per cent. above pre-war level.

In 1920-21 the radical reform of the telephone tariff was also taken in hand, the objective being not merely to raise additional revenue but to place the tariff on an equitable and scientific basis. The old flat rates, which had proved to be unjust as between subscriber and subscriber, were abolished and were replaced by a uniform system of an annual rental plus a fee, originally fixed at $1\frac{1}{2}d.$ for each local call. The trunk charges and minor rates were raised and the average over-all increase represented about 80 per cent. over the pre-war tariff.

In imposing the high rates which the prevailing level of costs required, the Government undertook to give relief as soon as a drop in prices permitted, and a beginning was made in 1922 when the letter

rate reverted to $1\frac{1}{2}d.$, postcards to $1d.$, and the printed paper to the pre-war minimum of $\frac{1}{2}d.$ Further reductions in the higher steps of the letter scale and in the parcel post were conceded in 1923, and successive reductions were made in the telephone rentals and in the local and trunk charges, the local fee being brought down to $1d.$ in 1924.

The restoration of penny postage is the one outstanding concession which on financial grounds the Government have not yet felt able to make. From the sentimental as well as the material point of view its popularity would be assured, and Ministers have expressed a pious hope that it may be a *fait accompli* within the lifetime of the present Parliament. The more enthusiastic advocates of cheap postage would have it that the penny post would pay for itself by the large accession of business which it would bring. This would require an addition of nearly 50 per cent. to the present volume of correspondence or about 1,500 million letters a year. With booming trade an increase on this scale might perhaps be achieved in ten years, but certainly not in one, and in any case it would entail a heavy increase of expenditure which the enthusiasts conveniently overlook. It is useless to ignore the fact that the cost to the Exchequer would run into a very considerable sum, though no doubt in time the stimulus of the cheap rate would begin to tell. The reduction of the letter rate from $2d.$ to $1\frac{1}{2}d$ in 1922 brought an increase in business of about 5 per cent. and entailed a sacrifice of revenue of some £5,000,000 a year. Since then there has

been an appreciable growth of correspondence, and even allowing for a rather higher percentage increase as the result of a reduction to a penny, the net annual cost to the Exchequer cannot be put at less than £5,500,000.

It is true that the Post Office surplus, as it stands at present, could carry the penny post. But to the Chancellor of the Exchequer it means five and a half millions less on the income side of his Budget, and if the Budget shows a prospective surplus, needless to say there are many other equally vocal competitors, whose claims for relief have to be weighed with those of the postal user. Incidentally it may be noted that the restrictive effect of an extra halfpenny on printed matter is much greater than on letters. Postal advertising, charitable appeals and a mass of miscellaneous circulars, which pass as printed papers, come within the halfpenny minimum and are killed by a higher charge. Unfortunately, while the letter, even at a penny, would show a margin of profit, the halfpenny rate, whether for postcards, printed papers or newspapers, does not pay its way. Though the charge for a letter is at present three times that for a printed circular, the circular costs practically as much for handling as the letter.

Until the middle of the nineteenth century the expenditure of the Revenue Departments, including the Post Office, was paid out of their collections, only the balance of revenue being transferred to the Exchequer. By an Act passed in 1854 a radical change was made. Revenue and expenditure were entirely separated, the former

being paid over to the Exchequer without deduction and the latter being authorised by annual votes of Parliament. The change had been advocated many years before by the Public Accounts Commissioners, who maintained that "no portion of the Public Treasure should be arrested, on any plea or pretence whatever, on its way to the Exchequer, and that no portion of it should be issued from the Exchequer without previous Parliamentary sanction."

The new system undoubtedly tended to strengthen the control of Parliament over expenditure and to exhibit more clearly the cost of administering the Revenue Departments. But as it entails the National Accounts being inflated by the gross Post Office expenditure on one side and the gross Post Office revenue on the other, it is not without its disadvantages, particularly at a time when the public mind is much exercised at the growing dimensions of the Budget. Every increase is ascribed to Government extravagance, and the critics seldom take the trouble to discriminate between expenditure which brings no tangible return and that which is more than balanced by the revenue it earns.

Post Office expansion is a healthy sign and is usually associated with a period of industrial prosperity; no one wishes to check it, and the bias of the House of Commons is generally towards increasing rather than cutting down its expenditure. But with the Budget figures in view the Chancellor of the Exchequer and the Treasury are naturally disposed to groan at the annual rise in the Post Office vote, even though it yields a more than

equivalent return in revenue, and to urge the postponement of schemes which, though not essential, would be welcomed by a commercial undertaking as a profitable investment.

While the bulk of Post Office expenditure is voted by Parliament on the annual Estimates and therefore becomes chargeable against the national revenue, the Telephone Capital Account is an exception and is financed by borrowings. The Treasury are authorised by periodical Acts of Parliament to raise loans for the development of the telephone system up to a specified maximum, which usually represents the estimated expenditure of two or three years. Each year the Post Office submits to the Treasury a programme of capital works, and when it is approved the Treasury make advances to the Postmaster-General as and when required for the execution of the programme. The money is actually borrowed from the National Debt Commissioners and is repaid to them through annuities, now generally spread over a period of twenty years, which are charged upon the Post Office vote. When the borrowing powers authorised by each Act are approaching exhaustion, Parliament is asked to confer further powers by a fresh Act. The proceedings on these Money Bills afford an opportunity, in addition to that provided by the Post Office vote, for Parliamentary criticism of the telephone administration.

Few people outside the limited circle which studies Government Accounts are aware of the immense capital demands which the present rate of growth of the telephone system involves. Up

to December 31st, 1926, the loans raised for the acquisition and extension of the system amounted to about £94,500,000, of which £32,700,000 has been repaid. New capital is now being put into the system at a rate of nearly £12,000,000 a year, and so long as the current demand for new installations is maintained, an annual programme of about this figure will have to be faced. It can safely be said that no industrial undertakings in this country, and very few abroad, are absorbing capital year by year at anything approaching this rate.

Apart from the telephone system, the Department's capital expenditure is practically confined to Post Office sites and buildings and certain telegraph equipment. It is a strange anomaly that these items, though just as much of a capital nature as telephone construction works, are charged upon the annual votes, with the curious result that a building which is used jointly for postal and telephone purposes is apportioned according to the estimated user of each service, the one part being paid for out of revenue and the other from loans; similarly the cost of an underground cable, which contains both telegraph and telephone wires, is apportioned between the revenue and the loan account according to the anticipated user of each wire, though the wires are in fact interchangeable and are sometimes used for both services simultaneously. There is no logical reason for the difference in treatment, and the present system might with advantage be replaced by a consistent classification according to the nature of the ex-

penditure, irrespective of the particular service for which it is required, that which is essentially capital being provided by loans and the remainder charged against revenue.

The Post Office Estimates and Appropriation Accounts and the figures appearing in the Budget statement and in the Finance Accounts of the United Kingdom do not represent, and do not purport to represent, the financial results of the Post Office operations for the year, though the uninitiated are often misled into believing that they do. They are purely cash statements and ignore many items which would be included in the accounts of a commercial concern. For example, the expenditure of other Departments, such as the Office of Works and the Stationery Office on behalf of the Post Office, is excluded, and no credit is taken for the numerous services rendered without payment by the Post Office to other Government Departments, such as the handling of official correspondence, the payment of Old Age and War Pensions and the administration of War Loans.

But the Post Office compiles and publishes every year a separate paper, known as the "Commercial Accounts," which are framed on a strictly commercial model and are audited by the Comptroller and Auditor-General. Services rendered to and by other Departments are brought in and proper provision is included for interest on capital, depreciation of plant and pension liability. Besides a general account, separate accounts are given in considerable detail of the three principal services, posts, telegraphs and telephones, and of a number

of subsidiary services. The Commercial Accounts give an accurate picture of the finance of the Post Office viewed as a commercial undertaking and should be consulted in preference to the Cash Account by anyone who wishes to follow the financial results of the Department's operations.

Considering the industrial depression of the last few years, the growth of Post Office business has been encouraging. In 1925-26, on the basis of the Commercial Accounts the gross income of the Department amounted in round figures to £61,900,000 and the expenditure to £55,200,000, leaving a surplus for the Exchequer of £6,700,000. With the exception of one of the war years, when conditions were abnormal, this is the largest Post Office surplus ever realised. Each year shows a steady rise in the volume of correspondence passing through the post, which now amounts to over 6,000 million packets per annum. While the telegraph traffic is slowly dwindling under the influence of telephone competition, the telephones are thriving with an annual increase of about 10 per cent. The telephones and some of the minor Post Office services pay their way with a small profit, but it is as true now as it was a generation ago that the mainstay of the Post Office revenue is the ordinary letter, which is still the principal contributor to the annual surplus.

It is sometimes suggested that the position of the Post Office as predominantly a commercial concern should be recognised by dissociating its finance from the National Budget, and leaving the Postmaster-General free, subject only to the over-

riding authority of Parliament, to fix his own charges, to raise his own capital and to develop the Post Office services as he thinks fit, exercising powers analogous to those of a company directorate. The avowed object of these reformers would be to eliminate the element of taxation in Post Office charges, to facilitate the rates being fixed at the equivalent of cost price by enabling the surpluses of the prosperous years to be carried forward for the support of the lean, and to oust the jurisdiction of the Chancellor of the Exchequer and the Treasury over Post Office finance and administration.

It is extremely improbable that any Government would propose, or that any Parliament would accept, in its entirety so revolutionary a scheme, which would cut across several of the accepted principles of national finance. But there would be much more to be said for a system under which the Exchequer would commute for a fixed annual sum, open to review at stated intervals, its claim to a contribution from the Post Office, whether as a payment in lieu of taxation or otherwise, and would liberate the balance, if any, of the Post Office surplus for the reduction of charges or the improvement of services. The national accounts need not then be swollen by the gross figures of Post Office revenue and expenditure, and although the principle that revenue should not be intercepted on its way to the Exchequer would be infringed, it should not be beyond human ingenuity to devise methods of Parliamentary control at least as effective as those now existing.

But a revision of the relations between the Post

Office and the Exchequer need not and should not entail a material weakening of the Treasury control over expenditure. The Post Office must ultimately have the security of the Exchequer behind it, the correlative of which is that the Treasury should retain the right of financial criticism and the power to check, if necessary, the optimism of a Postmaster-General who appeared to be heading for a deficit. In other directions too the Treasury must have a prevailing voice. No Postmaster-General could claim to go into the market for fresh capital, possibly at a moment when the Treasury had loan operations in view, without the cognisance and concurrence of the Chancellor of the Exchequer. And so long as the Post Office staff are Government servants, their pay and conditions of service must be in strict relation to those applicable to other Departments. For this purpose the co-ordinating authority of the Treasury is indispensable.

In the nineteenth century, the Treasury exercised, or attempted to exercise, a minute supervision over the details of Post Office administration which was probably in the main ineffective, and was certainly productive of circumlocution and delay. But in the last twenty-five years much has been done, by the substitution of general statistical standards for the scrutiny of individual cases and by the delegation of powers within specified limits, to concentrate the control of the Treasury upon matters of principle or of financial importance. And incidentally this has enabled the Post Office to carry decentralisation much further than would have otherwise been possible. Reference to the

Treasury is still required on a certain number of minor matters, which might be, and no doubt eventually will be, included among the delegated powers. But in general the control of the Treasury is neither excessive nor embarrassing and the theory that the two Departments are engaged in a continual guerrilla warfare is pure fiction.

Chapter III

INLAND MAILS

THE primary function of a Post Office is to deliver letters at their destination with the utmost possible speed and security. For this purpose there are two essentials—complete and rapid means of communication and a scientific system of distribution. The postal service is ultimately dependent upon rail transport, and from the Post Office standpoint the train service provided by the British railway system is extremely good. The intimate connection between the Post Office and the railways has been recognised by law since railways were first established. The Postmaster-General possesses statutory powers under which he can insist upon mails being carried by any train, and can call upon the railway companies to run trains at times and speeds to suit Post Office requirements. In practice, these powers are rarely, if ever, exercised and the mail service is regulated by comprehensive contracts between the Postmaster-General and the several companies. These contracts provide as a rule for the carriage of mails by all trains on the companies' systems, for the provision of Travelling Post Offices, and for the running of trains, known technically as "controlled trains," according to schedules which cannot be altered without the Postmaster-General's consent. As a result of nearly

a century of development, the Post Office, in co-operation with the companies, has established a closely connected network of mail trains covering the country from end to end and giving rapid communication between the most remote points. For example, a letter from Penzance to Wick, or from Grimsby to Holyhead, would travel by a series of controlled trains running in connection with each other at a speed nearly equal to that of the best passenger trains.

For these services the railway companies are entitled to remuneration which is usually settled by agreement, but in default of agreement may be referred to the Railway and Canal Commission. The payment to each company is built up from payments for the actual conveyance of mails, for the "control" of trains and for a number of miscellaneous services, and the general principles upon which it is assessed were laid down by the Commission in an arbitration between the Postmaster-General and the Great Western Railway Company in 1903. The payments for letter mails, exclusive of parcel mails which are dealt with on a different basis, come to nearly £2,000,000 per annum.

Scarcely less important than the means of communication is the system of distribution. The governing factor in postal organisation is the insistence of the public upon receiving their letters as early and posting them as late in the day as possible. The result is that the bulk of the mails have to be conveyed during the night, and the problem for the Post Office is so to organise its system of distribution, technically known as circulation, that a

letter posted in any part of the country may be delivered in any other part on the following day and, if possible, by the morning delivery. As every post office may have letters for every other post office, of which there are many thousands, it is obvious that a system relying entirely upon direct communication would be unworkable. Between large towns the correspondence can be, and usually is, transmitted in direct mails, but letters passing to and from the rural areas and smaller towns must be forwarded to some intermediate office which performs the functions of a clearing house. In broad outline, the system adopted is to treat the circulation for the whole country on the basis of the county. For each county or group of counties, one or more central distributing offices are selected which have a direct postal connection with all other offices in the same county or group. Letters from the smaller offices are dispatched from the office of posting to the most convenient county distributing centre and are then sorted and included in the mails dispatched by that office.

But even with a complete system of distributing offices there is a certain residuum which cannot be passed through an intermediate stationary office without serious delay or which cannot be sorted in time at the office of posting. This residuum is handed over to the extensive system of Travelling Post Offices, that is, railway coaches fitted up as sorting offices in which the correspondence is sorted *en route*. By this means delay in transit for the districts which the Travelling Post Office serves is completely eliminated. For

example, a letter from a village in South Wales for some remote hamlet in the North of Scotland would be despatched by the office of origin in the bag for the Travelling Post Office concerned, and would arrive as quickly as if it had been sent direct to the office of destination. The Travelling Post Office thus acts as a collecting office for a wide area at the early stages of its journey and as a distributing office on the later stages. The advantages of the system are most apparent in such areas as the sparsely populated parts of the North of Scotland where practically every office receives a direct mail from the Travelling Post Office on the Highland Railway. The Travelling Post Offices working up to London have somewhat different, though not less important objects. In order to secure immediate delivery over the whole of the London Postal District and to avoid congestion in the central sorting offices, the night mails arriving in the early morning make up separate mails for a large number of sub-districts in the London area, and, in addition, dispatch mails for connection with the first delivery to almost every office, large or small, in the suburban area up to fifteen or twenty miles from London. The same system is applied on a smaller scale to the great provincial towns, and a large part of the correspondence for Manchester, Liverpool, Glasgow, Bristol, Cardiff and Newcastle is sorted *en route* so that it may be ready for delivery immediately on the arrival of the mail train.

An important accessory to the Travelling Post Office is the well-known mail bag exchange apparatus by which mails are received into and dispatched from

the train while running at full speed. The apparatus attached to the sorting carriage consists of an iron arm from which the mail bags for dispatch, enclosed for protection in a heavy leather pouch, are suspended by a strap, and a stout net for the reception of the incoming pouches. A similar apparatus is placed at the side of the track at the point of exchange, and the suspended pouches are projected into the nets by the impact of the net against the strap. The apparatus attached to the sorting carriage is closed up flat against the side of the train when not in use, and is extended by one of the Post Office staff just before it is required. It is important that the apparatus should be extended at the right moment ; if it were done too early and the train passed through a crowded station platform with the net lowered, the results can be more easily imagined than described. Each apparatus point is known by some familiar landmark, and on the night trains the staff rely mainly upon the sense of hearing, judging the time to work the apparatus by the passage of the train through a station or a tunnel or over a bridge. The mail bag exchange apparatus enables intermediate towns and the rural areas served by them to obtain their letters direct from the trunk mail trains without the frequent stops which would be fatal to the early delivery of the more important mails, and in this way it plays a considerable part in the general scheme of postal distribution.

A Travelling Post Office, and in some cases more than one, runs daily on practically every main line of railway in the country. The three most important trunk mail trains are the Up and Down Specials on

the West Coast route between London and Aberdeen, the Great Western special which runs in both directions between London and Penzance, and the Midland Travelling Post Office with terminals at Bristol and Newcastle. As their designation implies, the two former trains are run exclusively for postal purposes. The train carrying the Midland Travelling Post Office takes passengers as well as mails.

To obtain a clearer picture of the working of the postal machine than any general description can supply, let us follow in detail a typical journey on one of the great mail trains, and we will select for the purpose the Up Special Travelling Post Office on its run from Aberdeen to Euston. Leaving Aberdeen at 3.25 p.m. the Up Special, with a Post Office staff of seven men, is the last train from the North which connects with the first delivery next day in the Midlands, London and the Home Counties. Before leaving, it receives the mails from the Buchan and Elgin branch lines which reach Aberdeen too late to be sorted in the Aberdeen office. Between Aberdeen and Stirling mails are received at stopping stations and by apparatus from about thirty towns, and the staff is engaged upon sorting the letters for Edinburgh, Glasgow, Perth and Stirling and the areas served by them. At Law Junction the mail is joined by a Travelling Post Office from Glasgow with a staff of twenty-four men which has collected heavy mails from Glasgow, the neighbouring counties and the West Highlands. It then proceeds to Carlisle, picking up at Carstairs the Edinburgh, Leith and Midlothian mails,

At Carlisle mails are received from about sixty towns in Northumberland, Cumberland and the South of Scotland, and from a Travelling Post Office working from Ayr to Carlisle. On leaving Carlisle the Post Office staff has been increased to fifty men and the train is now composed of eleven carriages, later in the journey increased to sixteen, five of which are used for Letter Sorting. Each of these five carriages is allocated to a particular division of the country, and offices sending mails to the Travelling Post Office sort their letters according to these divisions so that, immediately on receipt, they can be transferred to the proper carriage. Preston and Warrington are centres for the exchange of mails to and from the great industrial towns in Lancashire. At Preston a Travelling Post Office from Whitehaven brings in the correspondence from offices in Cumberland, Westmorland and the Furness district. At Warrington connection is made with the Night Mails to Ireland, letters for Northern Ireland being transferred to a train connecting with the Stranracr-Larne steamer, while those for the Irish Free State are despatched to join the Irish mail from Euston at Chester.

Crewe is reached at 12.19 a.m. and here the Up Special dispatches and receives an immense volume of mails. Crewe may be described as the night mail centre of the country, and a large number of the important mail trains are timed to meet there about midnight, so as to give connections with each other. In the space of about three hours thirteen Travelling Post Offices enter and leave Crewe Station, including the night mails from

London to Scotland and the up and down Irish mails via Holyhead. At Crewe the Up Special transfers to Travelling Post Offices working to Holyhead, Shrewsbury, Cardiff, Birmingham and York, some of which connect with still other Travelling Post Offices at their terminal stations, the correspondence which it has collected during its journey from Aberdeen for Wales, the Black Country and part of the Midland and the North-eastern counties. And it takes on board from these Travelling Post Offices, which have themselves reached Crewe shortly before midnight, the mails for the South which they have collected *en route* to Crewe.

The next stop is at Tamworth which provides an outlet for the counties of Derby, Nottingham, Leicester and Lincoln, and gives a connection with a Travelling Post Office leaving Tamworth for Lincoln at 2.25 a.m. At Rugby, the last stopping place before Euston, the mails for Northamptonshire, Bedfordshire and East Anglia are despatched, and the final night mails from Birmingham for London and the South are received. Between Rugby and Euston the staff are busily engaged in the final sorting of the mails for London and beyond, while letters for the intermediate towns are dispatched by the mailbag apparatus.

The mail with about 2,500 bags on board steams into Euston at 3.55 a.m. just twelve and a half hours after leaving Aberdeen, and finds a Post Office staff of forty or fifty men with as many vans awaiting it to transport its bags to the London delivery offices and railway termini. The London letters and those

for many towns in the Home Counties which it brings are due for inclusion in the first delivery, and it also brings correspondence for four Travelling Post Offices, leaving London between 4.45 a.m. and 5.40 a.m., for Bristol, Leeds, Bournemouth and Ipswich. To effect these connections a punctual arrival of the train and expeditious clearance from the station are essential. On a normal journey the Up Special receives and opens about 850 mail bags, makes up about 650, and deals with approximately 150,000 letters.

Working in connection with the mail trains are the steamboat services between England and Ireland, and between the mainland and the numerous islands round our coasts. The mails are usually conveyed by the passenger boats under contracts between the Postmaster-General and the companies concerned. The Post Office is subject to continual pressure to improve the frequency or the speed of many of these island services, particularly round the Scottish coasts, but, as on the ocean routes, the governing factor is really the volume of freight and passenger traffic. Although some of the services are supported not only by payments by the Postmaster-General for the carriage of mails, but by grants from the Secretary of State for Scotland, it is often impossible to meet the full extent of the islanders' demands.

An elaborate network of road services completes the system of postal communication. These services provide for the collection and distribution of mails before and after conveyance by rail; they transport the mail bags between the railway stations and

the local post offices and between head offices and branch offices, and they collect the postings from rural sub-offices and letter-boxes and, in the large towns, from the premises of individual firms which conduct an extensive postal business. In many rural areas, either remote from the railway or dependent upon branch lines upon which no trains are running in the early hours of the morning, a group of road services radiating from some convenient railway centre distributes the mails over wide tracts of country and gives a connection with the morning delivery which the railways by themselves could not provide. And in some remote districts in Scotland there are combined mail and passenger services, covering long distances, which, notwithstanding the substitution of the motor for the horse, are the lineal descendants of the stage coach of the eighteenth century.

Until a few years ago the road services were worked entirely under contract. But it was found by practical experiments that mail vans owned by the Post Office and driven by postmen could economically combine the transport of mails with the collection and delivery of letters and parcels and with similar duties which could be entrusted to the postmen-drivers, but not to a contractor's employees. Services on these lines have been opened in a number of town and rural areas and the results show a considerable reduction in costs accompanied in many cases by noticeable improvements in the postal facilities. Starting with the rural areas, the Post Office has embarked upon motor transport on a large scale; it now owns a fleet of over a thousand

mail vans and some 250 motor-bicycles devoted to postal purposes, and each year brings demands for further expansion. In some large towns where the rates demanded by contractors seemed excessive, the Post Office has taken over the whole of the local van services, and in others the knowledge that the department is ready to do so has had a wholesome effect on contractors' quotations. A record of mileage and a detailed analysis of running costs of each van is maintained for control purposes, and a close watch is kept upon the general level of costs and the performances of individual vans.

Until almost the end of the nineteenth century the free delivery of letters, though, of course, it included all the towns and populous villages in the country, was still far from universal. There were wide areas in the more remote parts of the rural districts which were never visited by the postman, and for which all letters had to be called for at the nearest post office. As part of the postal improvements made to celebrate the Diamond Jubilee of Queen Victoria in 1897, the Government decided to give a regular free delivery of letters to every house in the country. The extension took two years of strenuous work to complete, and at the end it was found that a free delivery had been given for the first time to some 55 million letters a year. The principle of the regular delivery is still maintained, though it is not of course in all cases a daily one. The rural delivery is probably one of the least remunerative parts of Post Office work, and the cost of giving a delivery every day at isolated cottages receiving

two or three letters a week would be prohibitive. Indeed, in the remote districts it not infrequently costs the Post Office sixpence or a shilling to deliver a halfpenny circular. So complete, however, has the system of postal delivery now become that even the most remote farmhouse on Dartmoor or in the Highlands and every inhabited islet in the Orkneys or Shetlands is regularly visited by the postman. The rural delivery work employs a small army of postmen on foot, on bicycles, with horses and carts, and in some districts on motor bicycles.

The rural postman has a special character of his own. He is not only a deliverer of letters but he is also a walking post office. He sells stamps, he accepts parcels or registered letters from anyone on his walk; he blows his whistle to announce to the waiting village that he is ready to collect their letters, and he will obtain postal orders for anyone who cannot visit a post office. He is, in fact, probably in closer contact with the public in his district than any other employee of the Post Office, and he is one of its most popular representatives.

An interesting novelty in the transport of mails is the Post Office London Railway. The scheme was originally devised by a Post Office Committee before the war, and the construction of the railway was authorised by Act of Parliament in 1913. Its objects are to reduce the transit time between the large sorting offices and the railway termini, to give an even and continuous flow of traffic into and out of the sorting offices, and to eliminate the delays due to road repairs, fogs, and other causes which

occasionally result in the mails missing their appointed trains. Incidentally it will clear a considerable volume of mail van traffic off the congested London streets. The railway runs underground between the Eastern District post office in Whitechapel at one end and the district office near Paddington Station at the other and passes under seven of the important London sorting offices, as well as Paddington and Liverpool Street railway stations; at each of these points there is an underground station equipped with lifts, conveyors and chutes for the conveyance of mails between the sorting offices or railway stations and the platforms directly below them. The running tunnels are nine feet in diameter and have two lines of track, one for eastbound and the other for westbound traffic, with a gauge of two feet. The trains will be electrically driven at a speed of about thirty-five miles per hour between stations, and will normally consist of three steel waggons each holding about half a ton of mails. The principal feature of the railway is that the trains will have no drivers or guards on board, but will be operated entirely by automatic means under the control of a switchman at each station. The stations are so constructed that two, three and sometimes more, trains can be berthed at each platform simultaneously, and by ingenious electrical contrivances each train can be stopped automatically at its allotted berth. The progress of the scheme has been hampered by many disappointing delays due, firstly, to the war and afterwards to the abnormally high prices quoted by the manufacturers for electrical equipment which compelled the Post Office to defer

placing orders until prices came down. But it has now practically reached the stage of completion and within a few months will be taking its full load of traffic, which is expected to amount to some $2\frac{3}{4}$ million letters and 50,000 parcels a day.

The parcel post is a comparatively modern service, dating from 1882, and is organised on much the same lines as the letter post. In the larger towns the sorting and delivery is in the hands of a separate staff, sometimes located in a separate office, but in the rural districts the postman takes out his letters and parcels for delivery together. Under the original Act of Parliament authorising the establishment of the parcel post, the railway companies were remunerated for their services by a proportion of the postage receipts, which was then fixed at 55 per cent. After the war, when the parcel post charges, like other Post Office rates, had been considerably increased, fresh negotiations with the companies were opened and they agreed to accept 40 per cent. of the higher rates, a settlement which again was confirmed by statute. The railways' share in the parcel postage is paid to the Railway Clearing House which divides it among the participating companies without the intervention of the Post Office. At present the average postage per parcel is in round figures 9*d.*, of which the companies receive rather less than $3\frac{1}{2}$ *d.*

Chapter IV

IMPERIAL AND FOREIGN MAILS

The foundation of the modern international postal system is the Postal Union Convention, which was the outcome of the first Postal Union Congress held at Berne in 1874. A meeting of the Congress for the revision of the Convention usually takes place every five or six years and is attended by delegations from the signatory powers which now include every nation of the civilised world. The last Congress was held at Stockholm in 1924 and the next is due to meet in London in 1929. An assembly composed of nearly two hundred delegates from over eighty different administrations, the largest of which has no greater voting power than the smallest, may appear a singularly unsuitable governing authority for the international postal organisation. But in practice it has been remarkably successful. In spite of its unwieldy size and of the difficulties of language, it has evolved a code of regulations which secures to the mails of every nation safe transit without formality or delay from one end of the world to the other through any number of intermediate administrations.

Before the Berne Congress the charges upon foreign letters were chaotic. Separate agreements were negotiated with each country regulating the payments to be made on letters, newspapers, etc.,

for delivery in that country and on those in transit for other destinations. Each country of course made the best bargain it could for itself, particularly when a costly subsidised sea service was concerned. The postage charged was built up of the sum of the various terminal and transit rates and thus not only were the rates to each country different but there were different rates to the same country according to the route selected. For example, there were six different rates on letters from London to Constantinople ranging from 8*d.* to 1*s.* 7*d.* for $\frac{1}{4}$ oz. The charge for a 1 oz. letter to Constantinople via France was 6*s.* 4*d.* The postage was paid sometimes by the sender, sometimes by the addressee and sometimes shared between them. Each mail was accompanied by a statement of account, in some cases of almost incredible complexity, including a dozen or more separate calculations of debits or credits, each on an entirely different basis; and as the mail had to be divided into as many different sub-divisions and each separately weighed, some in ounces and some in grammes, it is not surprising that letters were often delayed while the calculations were being made.

One of the great reforms initiated by the original Convention and completed by the Congress of Paris in 1878 was to fix at a uniform figure the postage rates chargeable on each class of correspondence passing between the contracting states, i.e. 2½*d.* for letters, 1*d.* for postcards, and ½*d.* for printed matter. These rates remained in operation until the war, when the depreciation of currencies made some differentiation inevitable. While the Postal

Congress has recently re-established the pre-war rates on a gold basis as the standard, it still allows to any country, as a temporary and exceptional measure, the option of increasing them, but within a carefully limited maximum. The rates actually charged are, of course, based on the gold rates converted into local currency. The British foreign rates have reverted to the pre-war level, but in countries suffering from currency depreciation they are very much higher. Thus, in France the foreign rate is 1.50 francs instead of the familiar twenty-five centimes of pre-war days.

The Convention empowers countries to form "restricted Unions" *inter se* for the purpose of "improving Postal relations," a phrase which was expanded at the Washington Congress of 1897 to cover reductions of postage rates. This power was invoked in 1898 to establish the Imperial Penny Postage scheme which was extended ten years later to include the United States. Though the penny has now become three-halfpence, the principle that the initial Imperial rate should be identical with the Inland rate has been maintained.

The Convention places the cost of the carriage of foreign mails as far as the country of destination upon the country of origin, which collects the postage. But each country guarantees safe transit by the best available route of any mails passing through its territory and provides such labour and conveyance as may be required. It is assumed that the inward and outward flow of correspondence (other than parcels) between any two countries is equal, and as between terminal administrations no

payment passes. Transit or intermediate countries recover payment for their services on the basis of the weight of mails crossing their frontiers according to a scale graduated by distance, which is laid down in the Convention. To simplify accounting the weights are taken for one month every five years and govern the payment for the quinquennium. In the same way the Convention lays down a scale for sea transit ; and any country may use the contract services of other countries and pays according to this scale. The Convention scales are generally known as Postal Union Rates. By this system the mails of the world are carried by land and sea regularly and smoothly with the minimum of international correspondence. Disputes, financial or otherwise, are rare, and when they occur they are amicably settled by arbitration. The development of the Postal Union has been accompanied by a progressive standardisation and reduction of transit rates, which were at the outset, particularly for sea services, fixed at a relatively high level : and the British Post Office has taken an active part in securing the cheapening of the cost of carriage of international mails.

The foreign parcel post is worked on similar lines. Each country undertakes the onward conveyance of any parcel mails which are entrusted to it in transit and is at liberty to use for its own mails any contract services provided by other administrations. But parcels require much more elaborate accounting arrangements than letters. The outward and inward flow between two countries is often widely different and the charge upon each parcel is therefore

accounted for separately. The postage paid by the sender is built up from the terminal credits claimed by the countries of origin and destination and the credits, if any, due to transit administrations or in respect of sea services. Great Britain is not a party to the International Parcel Post Convention which in some important details does not fit in with our requirements, but we have separate Parcel Post agreements with almost every civilised country.

When steamships began to displace the old sailing-packets, it soon became evident that for the mailship of the future the Government must look to the mercantile marine. The days of Government packets, at any rate on the ocean routes, were numbered, and the era of mail contracts had begun. The first ocean contract was concluded with the Cunard Line in 1839 for the conveyance of the American mails. At the time the Government was anxious to encourage commercial companies to build steamships, and a mail contract was a valuable inducement. When the receipts from the ordinary traffic could not be expected to balance expenditure, contracts were awarded upon terms which were calculated to make good the whole deficiency. The objects of the contracts were declared to be—"to afford a rapid, frequent, and punctual communication with those distant ports which feed the main arteries of British Commerce, and with the most important of our foreign possessions; to foster maritime enterprise, and to encourage the production of a superior class of vessels which would promote the convenience and wealth of the country in time of peace, and assist in defending its shores against

hostile aggression." In fact, the contracts were virtually subsidies in aid of shipbuilding and the payments represented much more than could be assigned to the value of the postal services performed.

The cost mounted up at an alarming rate. In 1853 it had reached over £850,000 per annum, three-quarters of which went to the three great Companies, the P. & O., the Royal Mail and the Cunard in respect of the services to India and the East, the West Indies and North America. The inevitable reaction followed. Parliamentary Committees in 1853 and 1860 reported that the subsidies had served their purpose, that, at any rate on competitive routes, the State might fairly expect to get the services performed at a much lower figure, and that it was no longer necessary to subsidise contractors by contributing a considerable proportion of their receipts.

Post Office policy gradually moved in this direction. The element of subsidy disappeared from British mail contracts and for many years past the contract payments have represented no more than a fair equivalent for services rendered. The object of a mail contract is to ensure the departure and arrival of the mail ships at fixed times and at regular intervals, and to obtain control over their speed and itinerary. Upon some of the mail routes, owing to seasonal fluctuations, the ordinary traffic would not in itself justify commercially a continuous service of fast steamers throughout the year. In such cases, and particularly where the choice of fast boats is limited, a regular mail service can only be maintained by means of a definite contract. And the

acceptance of the contract conditions as to regularity and speed entitles the shipping company to reasonable remuneration in addition to a payment of the nature of freightage for the actual conveyance of mails.

The Post Office has seldom experienced any serious difficulty in negotiating agreements with the great shipping companies upon mutually satisfactory terms. This is partly attributable to the fact that the stipulations contained in British mail contracts are confined to matters affecting the mail service, the only exceptions being requirements as to the nationality of owners, officers and crews and certain Admiralty clauses which impose no serious burden upon the shipowner. Some of the Dominion Governments have adopted a different policy and include in their contracts a number of extraneous conditions, dealing with such matters as the provision of refrigerating space and the freight rates upon agricultural produce. The Post Office view has been that conditions which curtail the freedom of the shipowner to fix his own rates or to handle his traffic as he thinks fit, must in the long run be reflected in the cost, and that if they are desirable, they should form the subject of agreements separate from the mail contract. Parliament and the public can then judge whether the advantages of the commercial clauses are worth the cost entailed by them.

The Post Office retains its legal right to embark mails upon any ship at the statutory ship letter rate of one farthing or one halfpenny per article according to distance. This method is still employed on certain services. In fact experience shows that on

competitive routes, provided the sailings are sufficiently frequent, a mail contract is not essential to secure a satisfactory service. The mails for the West Indies and for South America have been carried for some years without a contract and on the whole the service is better and considerably cheaper than when mail contracts were in force. Instead of the mails on hand having to await the weekly or fortnightly sailing of a contract ship, they are placed upon any ship promising an early arrival, irrespective of the Company to which it belongs. Payment is made to the Company concerned for the mails actually conveyed either at ship letter rates or at agreed rates on a tonnage basis. Generally speaking, the more frequent sailings more than compensate for the absence of fixed dates of dispatch.

The Post Office now holds only three contracts for ocean mails, the comprehensive contract with the P. & O. for the service to India, the Far East, and in alternate weeks to Australia, and the contracts with the Cunard and White Star Lines for the bi-weekly service between Southampton and New York. The mails for South Africa are conveyed weekly by the Union Castle Line under contract with the South African Government, and the Commonwealth Government have a contract with the Orient Line for the Australian service.

The Continental mails are carried by the ordinary passenger services. To most of the European capitals there are two, in some instances three, and to Paris, four dispatches daily from London, which connect with the ordinary cross-Channel services. For the transit to the more distant parts of Europe,

the great trans-European trains, such as the Orient, the Simplon-Orient and the Ostend-Vienna Expresses, are used. So vital are these regular long distance services to the life of Europe that within two years of the Armistice a special conference had been held at Paris to further the restoration of the mail services within the continent of Europe.

In order to accelerate delivery, all postal administrations have adopted by mutual arrangement the practice not merely of sorting their outward foreign mails for dispatch according to the country of destination, but of subdividing them still further. Where the correspondence passing between one country and another is relatively small, the subdivision will probably consist of a mail for one or two of the important towns and an omnibus mail to contain the remainder. On the other hand, the mails between two countries with large business and social relations will not only be divided into direct dispatches to many of the important towns, but to a large number of Travelling Post Offices. A further refinement is the sorting of correspondence for large cities into local divisions. In the mails for France, for example, separate bags are made up for such towns as Lille, Marseilles, Nice and Monte Carlo and for the Travelling Post Offices running to Paris from Calais and Dieppe; and the correspondence for Paris itself is sorted before leaving London according to the different Arrondissements. In the reverse direction, mails for the London Districts (E.C., S.W., etc.) and for large towns such as Liverpool or Manchester are made up in Paris. In the case of mails for the

Dominions and the United States, a very minute subdivision is made, which sometimes even includes separate mails for the suburbs of large towns. The interval between arrival at the office of destination and delivery is, as a rule, a short one, and it is desirable to provide as many direct mails as possible containing correspondence for local delivery. If separate bags for places near those towns are not warranted, it is the practice to enclose separate labelled bundles. This arrangement not only accelerates the correspondence for local delivery but frequently enables correspondence for more distant places to obtain an earlier onward connection.

The history of the Indian mail is an interesting story. For two centuries postal communication through the vast area from the Cape of Good Hope eastward to Cape Horn was in the hands of the East India Company. The Company had a large fleet engaged in the Eastern trade and provided a service which developed with the expansion of trade and was probably much superior to anything the Government could have offered. In 1830 Thomas Waghorn, a member of the Bengal Pilot Service, broached a scheme for a new service via Suez and after some difficulty succeeded in getting the Government and the East India Company to adopt it. At first the mail was sent by the long sea route from Falmouth to Alexandria, but two years later the obvious advantages of the overland route were recognised and the mails were despatched across France by coach from Calais to Marseilles. Thence they were shipped to Alexandria, taken by canal to Cairo and conveyed by camels across Egypt

to Suez, where they were again shipped to Bombay. Camel transport gave way to the Cairo-Suez Railway in 1858, and in 1870, in consequence of the interruption of the Paris route by the Franco-Prussian War, Brindisi replaced Marseilles as the European terminal port. Although the Suez Canal was opened in 1869, steamers could only proceed during daylight and then at the rate of about five miles an hour. Under these conditions the railway continued to afford the quickest transit across Egypt and was used until 1888, when the Canal authorities permitted night travel and the railway was given up in favour of through steamers.

During the Great War the overland route was suspended for a time; when it was resumed, the Italian route was abandoned and the Indian mail was transferred to Marseilles which still remains the terminal port. The Brindisi route entails not only the extra cost of transport through the length of Italy, but a shuttle service between Brindisi and Port Said to give a connection at Port Said with the England-Bombay mailship. Brindisi gives a relatively small acceleration and there is no probability at present of a reversion to the pre-war arrangement.

. In the alternate weeks in which the P. & O. performs the Australian service, the mail averages over 10,000 letter bags and 4,000 parcel bags. The ramifications of the service are impressive and justify its claim to be considered the premier mail service of the world. It carries the mails for Egypt, Palestine, Syria and neighbouring countries, which are disembarked at Port Said. At

Aden the East African mail branches off to connecting services, and the mails for India, Irak and Persia and those for Australia and the Far East then proceed by separate steamers, the former to Bombay and the latter direct to Colombo. At Colombo the mails for China, the Straits Settlements, Siam and the East Indies are transhipped to another connecting service provided by the P. & O. Company, and the Australian mail proceeds to Fremantle, where the letter bags are disembarked and conveyed by the Trans-continental Railway to their several destinations in Australia. To-day the Indian mail reaches Bombay in little over a fortnight from London, and in a few weeks hence when the Air Service is started urgent letters will be carried in eight or nine days. In the light of our modern standards, the following extract from the report of the Committee of 1853 on Mail Contracts makes curious reading—"The mails are despatched twice a month and are conveyed to their destination with a regularity and rapidity which leaves nothing to be desired. The time occupied in the voyage to and fro between England and Bombay, which before the establishment of the overland route, averaged about two hundred and twenty-four days, is now no more than eighty-seven days."

The most recent development of postal transport is the air mail. Beginning with the London-Paris service opened in 1919, the air mail has gradually secured a footing as a valuable adjunct to the ordinary mail service for urgent communications. New routes have been opened and connections to many of the principal cities on the Continent have been

established; the correspondence carried by air increases year by year and a high standard of regularity is now attained. In summer, air mails are dispatched daily from London to France, Holland, Belgium, Germany, Switzerland, Denmark and Sweden, and some of these services are maintained through the winter months. But the advantage of air transport lies in speed and in speed alone, and to neighbouring capitals, such as Paris, Amsterdam and Brussels, the distances are so short and the existing means of communication are so good, that for postal purposes air transport is of very limited value. At present the most promising field is found to lie in the combination of the aeroplane by day with trains or ships by night. Composite services on these lines are in operation to several of the large cities of Europe, e.g. to Stockholm, Moscow, Milan and Vienna, and save a day, or in some instances, two days in transit. Experience shows that, as might be expected, the greater the acceleration the greater the proportion of letters attracted to the air. A striking example is the fortnightly service which works over the 850 miles of desert between Cairo and Baghdad in connection with the mails to and from England. The normal mail service to Baghdad is via India and is necessarily slow. The air service gives a saving of about sixteen days and attracts about 40 per cent. of the mail in the week in which it runs.

The value of air transport for postal purposes will be immensely increased when regular night flying is practicable. Many of the ordinary mails leave London at night and consequently obtain a start of twelve hours over the aeroplane which leaves the

next morning. We can look forward to the day when letters written during business hours in London will be delivered early the next morning at distances of 700 or 800 miles in important towns such as Copenhagen, Hamburg, Berlin, Vienna, Prague, Berne and Milan. It is over these or greater distances that speed becomes an important factor and the aeroplane comes into its own.

Under existing conditions the high cost of air transport is in itself a bar to the conveyance by air of anything but urgent communications prepaid at a special rate, and considerable reductions in running costs will be necessary before the whole of a heavy mail could be carried by air at the existing rates of postage without serious loss. It is a fallacy to suppose that letters are invariably urgent. The limited use made of existing air services, where the extra fee is not more than twopence or threepence, shows that the amount of really urgent correspondence is limited.

The future of air mails lies even more in the still longer routes which within a few years will almost certainly be established. When a saving of a week or more on services to the remote parts of the Empire can be regularly obtained, air transport will attract a much wider clientele and may produce far-reaching changes in our ocean mail system.

Chapter V

THE TELEGRAPH SERVICE

THE earliest use of the electric telegraph was for railway signalling purposes, and it was some ten years before it became available to the general public. The pioneer company commenced operations in 1846, and the steady expansion of its business soon tempted rivals into the field. Competition, though it involved unnecessary expenditure in the duplication of plant, offices and personnel, was an effective instrument in bringing down the charges to the public, and for some years a flat rate of a shilling for twenty words, irrespective of distance, was in force on the competitive routes. But experience proved that the flat rate was unremunerative, and by agreement among the companies a uniform zone tariff, in which the shilling charge was limited to distances of a hundred miles or less, was restored.

The first indication of a demand for the State ownership of the telegraphs made its appearance about 1863. The waste entailed by competition between a number of separate and independent companies began to attract attention, and the business community was gradually waking up to the benefits obtainable from a more extensive telegraph system and a cheaper tariff. The principal shortcomings alleged against the

companies' administration were excessive rates, delays and inaccuracies in the transmission of messages, failure to serve important towns and districts, and a general reluctance to develop the telegraph system to meet public demands. Some of these criticisms rested on a very flimsy foundation, but others were substantial and legitimate grievances. So long as private companies, owing a duty to their shareholders, remained in possession, they naturally concentrated upon the more populous towns which yielded the bulk of the traffic, and left many of the smaller towns and most of the rural areas unprovided for. In the largest towns the companies' offices were grouped in the business centres in close proximity to each other, leaving the suburbs and outlying districts with no telegraph office within convenient distance; while in the smaller towns the office was usually situated at the railway station, which in those days was often more than a mile from the centre of population. The telegraph system had in fact grown up round the railway system, and many of the railway wires were used jointly for railway and public traffic, entailing delay to both services. Some of the defects were the result of competition rather than of private ownership and might have been met by amalgamation. But the political objections to conferring a monopoly of an important and growing public service upon a private corporation were recognised and nationalisation was generally accepted as the remedy. It was claimed that with a unified Government system, duplication of plant, offices and personnel could be eliminated and that the

consequent savings would be available either for an extension of the system into unremunerative districts or for a reduction of the tariff or both.

The Post Office reported unreservedly in favour of State acquisition. Stress was laid upon the experience of Belgium and Switzerland, where under State control the telegraph services were expanding rapidly and were then paying their way in spite of remarkably low tariffs. It was pointed out that the Post Office, through its 12,000 local offices, possessed peculiar facilities for extending the telegraph service at a minimum cost, and estimates were given foreshadowing a substantial profit at a flat rate tariff of a shilling for twenty words. With this report behind them, and possibly stimulated by the imminence of a General Election to press forward what was known to be a popular measure, the Disraeli Government introduced a Bill in the session of 1868 for the purchase of the telegraph system. The Bill was opposed at the outset both by the telegraph companies and the railways, but during its passage through Parliament terms were agreed with both these interests and the opposition was withdrawn.

It may be noted in passing that the original Act of 1868 did not confer a monopoly, which the Government at the time considered unnecessary. But by 1869 opinions had changed and it was thought prudent to obtain protection against the establishment of new companies which, unburdened with the obligations imposed on the State system, would confine their activities to competing for the more lucrative business, such as the Stock Exchange

traffic. The Act of 1869 accordingly granted the Postmaster-General a monopoly of inland telegraph business, while he on his part became obliged, if so required, to purchase the undertaking of any existing telegraph company.

The compensation paid to the companies was based upon twenty years' purchase of their net profits in the preceding year, but some of them received substantial additional payments for specific purposes. The railway companies were bought out on a similar basis, receiving twenty years' purchase of their net revenue from public telegrams, besides compensation for the grant of perpetual wayleaves, for the purchase of their reversionary interests on the expiration of the telegraph companies' leases and for various other rights. A number of claims were left over to be settled by arbitration, the last of which was not concluded until some ten years later.

The total payments for compensation came to approximately £8,000,000, of which £7,200,000 went to the telegraph companies and £800,000 to the railways. The value of the plant acquired was estimated at the time at £2,500,000, but subsequent calculations suggest that £1,500,000 would have been nearer the mark. Up to 1873, when the capital account was closed, the Post Office had spent £2,130,000 upon extensions and improvements, and the total capital expenditure was therefore £10,130,000, which was raised by the creation of Consols and became merged in the National Debt. The cost of subsequent extensions has been voted annually by Parliament on the Post Office Estimates.

The compensation terms were certainly liberal, and in many cases excessive. But it is fair to remember that the companies had been operating, not as licensees, but as pioneers in a free market, and that they had successfully tided over the lean years and were reluctant vendors of a business which was showing rapid expansion and growing dividends. Contemporary estimates indicated that even allowing for the inflated purchase price, the tariff could be reduced and a satisfactory service still maintained. What was not foreseen was the rising curve of operating expenses, and particularly wages, which, combined with the introduction of the sixpenny telegram, converted the anticipated profit into a permanent deficit. But it is a fallacy to suppose that the existing telegraph deficit is attributable to the excessive price paid for the system ; it has in fact nothing to do with it. The plant was revalued in 1912 and for the last fifteen years the capital charges debited in the telegraph accounts have been based upon the value of the plant so ascertained, as modified by subsequent additions.

But although the original capital, so far as it was not represented by tangible assets, was written off, the Act of 1868 imposed two burdens which the telegraph service has never been able to jettison. Under the companies' regime they were the collectors as well as the distributors of news, and the Press were dependent upon what the companies chose to give them. When the Government assumed control collection was divorced from distribution, and the telegraph service became merely a medium of

communication. This was undoubtedly sound policy, but during the proceedings in Parliament the Press secured the insertion of a clause fixing the charges for Press telegrams at 1s. for a hundred words by night, or seventy-five words by day, with an additional 2d. per hundred (or seventy-five) words for the transmission of copies to each additional address, whether in the same town or not. In 1920 these rates were increased by 25 per cent., and in the case of the copy rate by 50 per cent., to meet increasing costs. But the Press rates have never been remunerative, and though the loss has been slightly reduced in recent years by the policy adopted by the Press Association of renting private wires and providing their own operators, the deficit is still estimated at over £200,000 per annum.

Another but smaller millstone was the right of sending free telegrams upon railway business which was conferred upon the railway companies by the Act of 1868. In its original form this privilege was unrestricted, but in 1892 after negotiations with the companies it was commuted into a right to send annually a fixed number of telegrams containing a fixed number of words. Even with this restriction, about a million telegrams a year are sent free which would cost the companies over £50,000 a year if they were charged at the public tariff.

On February 5th, 1870, when the telegraph service passed to the control of the Post Office, business was opened at about a thousand postal telegraph offices and at 1,800 railway stations, where the railway companies acted as agents of the Postmaster-General. The charge was a shilling for

twenty words with an extra threepence for each five additional words, the names and addresses of senders and recipients being sent free. By 1873 2,500 new offices had been opened and the traffic had risen from seven million to fifteen million telegrams per annum.

During the next ten years the business grew steadily and showed some prospect of solvency, but in 1883 a private member's motion advocating the immediate introduction of sixpenny telegrams was carried by the House of Commons against the advice of the Government. In spite of forebodings as to the financial result of a large reduction of charge on an unremunerative service, the Government decided to acquiesce in the decision of the House and immediately embarked upon the construction of the plant required to carry the additional traffic. The sixpenny rate was introduced on October 1st, 1885, and the number of telegrams at once rose from thirty millions to fifty millions a year. The sixpenny telegram held the field for thirty years, until under pressure of war conditions the minimum was first raised to ninepence and in 1920 was further increased to a shilling for twelve words, with an extra penny for each additional word.

Financially the telegraph service is not, and never has been, a success. Before the war the deficit, after providing for interest on capital, had risen to about £1,250,000; it now stands at a slightly higher figure. In other words, the doubling of the tariff has scarcely sufficed to counterbalance the increased costs due to post-war conditions combined

with a decline in traffic, for which telephone competition is mainly responsible. The salient feature of telegraph finance during the last fifty years has been the steady rise in wages, which has outstripped the savings achieved by scientific and technical improvements. At present the revenue derived from the average telegram is slightly over 1s. 3d., while the cost is 1s. 8d., of which staff costs account for about 80 per cent. and plant and accommodation charges for 20 per cent. In 1870 the pay of a telegraphist averaged about 5d. per hour; in 1885 it had risen to over 6d., in 1914 to about 9d., and it now exceeds 1s. 6d.; in other words in the last forty years wages have trebled while telegraph charges have only doubled.

As labour costs account for the bulk of the expenditure, here, if anywhere, must be found the principal field for economy, and it is one of the functions of the telegraph administration to secure the closest adjustment of staff to traffic without impairing the quality of the service. The problem, seldom a simple one, is made more difficult by the unequal incidence of telegraph traffic. It is heavier in summer than in winter, and the daily curve shows a steep morning peak with a smaller afternoon peak and deep valleys between. In its sensibility to external events the telegraph service may be described as one of the nerve centres of the country. Some incidents, such as a General Election, a Bank Holiday, or the Derby, can be provided for in advance; others cannot be foreseen and yet may be reflected in a sudden and sometimes unmanageable jump in the telegraph traffic within a few minutes.

On the day when King Edward's Coronation had to be postponed, 314,000 telegrams passed through the Central Telegraph Office as compared with a normal day's load of 160,000, and the abrupt declaration of the railway strike in 1919 approximately doubled the traffic. On one occasion 89,000 telegrams were tendered in one batch at the Central Telegraph Office as a final round up of possible subscribers to the "Encyclopædia Britannica."

Unexpected rushes such as these are a nightmare to the controlling officers and can only be dealt with by overtime and other emergency measures. To gauge the staff required for normal purposes, a standard output has been evolved for each of the different types of instrument in use, which, in conjunction with periodical traffic returns, enables a close check to be maintained both locally and at headquarters upon the staff employed at each centre.

Many commercial undertakings have found that an improvement in process or procedure, apparently insignificant in itself, may yield astonishing savings when applied systematically throughout a large organisation, and nowhere is this more true than in the extensive field offered by the Post Office services. Methods of procedure are kept under detailed examination and any suggestion which promises economy, however small, is carefully sifted by experts and adopted if the verdict is favourable.

Two striking examples taken from the recent experience of the telegraph service may be of interest. For years a carbon copy was made, sorted

and preserved of every telegram as sent out for delivery, the theory being that authoritative copies were indispensable for dealing with subsequent queries or with complaints of delay or inaccuracy. It was eventually suggested that for the great majority of inquiries the original handed in by the sender or the form delivered to the addressee would suffice, and the carbons were accordingly abolished. The resulting saving in paper, labour and storage accommodation is estimated at over £10,000 per annum, and no one is known to be any the worse.

The second instance proved even more lucrative. Until a few years ago it was the normal practice to hand out telegrams for delivery haphazard to the first available messenger, who sometimes started out with a single message and sometimes carried a batch for addresses in several different directions. This has been replaced in all the larger towns by an organised system of rounds or "walks," a messenger being dispatched on each walk at intervals of five, ten or fifteen minutes and taking any telegrams which have accumulated for that walk since the departure of his predecessor. By this means the messenger staff has been substantially reduced, the average time of delivery has been improved and a saving estimated at £70,000 per annum has been realised.

But if it had not been for the progress of electrical invention, the picture of telegraph finance would have been still more sombre. Perhaps the most striking advance has been the remarkable improvements in the capacity or output of wires and instruments. In 1870 a telegraph wire gave only a

single channel of Morse communication; soon after came duplex which enabled a message to be sent simultaneously in both directions, and this was succeeded by quadruplex and multiplex working. By the multiplex system a single circuit may yield six channels of communication in each direction or twelve in all. At the same time by the development of "repeaters," the function of which is to strengthen the current *en route*, the increased carrying capacity has been made available on the long distance routes.

Complementary to the improvement in line capacity has been the evolution of high-speed machine telegraphs. Morse, which was for many years the characteristic British system of telegraphy, has been superseded to a large extent by what is known as the five unit code. And the traffic between London and the great provincial cities is now carried by automatic instruments by means of which eight operators working on a single circuit often transmit from 350 to 400 messages in an hour; fifty years ago to carry the same number of messages fourteen operators and seven wires would have been required. On most modern instruments the signals are transmitted by means of a keyboard closely similar to that of a typewriter; at the receiving end the message appears, not in code signals which require to be translated into plain language, but in ordinary characters either on a tape which can be gummed on a telegraph form or on a sheet of paper which has only to be detached from its reel and enveloped for delivery. As in many other industrial processes where machinery

has replaced human labour, the element of skill is in a large degree transferred from the operation to the maintenance and adjustment of the delicate instruments employed.

The stability of the telegraph service has been immensely improved by the substitution of underground cables for overhead wires on the principal routes. Open wires are peculiarly liable to damage from storms, and before the advent of the underground system large areas, including many important towns, were frequently isolated telegraphically for some days until the havoc could be repaired. Probably the most destructive storm in telegraph history was the blizzard of March 27th, 1916, which swept across the Midlands from N.E. to S.W. and practically demolished the overhead system over a belt nearly a hundred miles wide, stretching from the North Sea to the Bristol Channel; forty-one thousand poles were broken or uprooted and the repairs cost the Post Office over £600,000. The underground cables then existing saved the situation; without them the Midlands and the North would have been entirely cut off from London, and the disorganisation of the service, serious as it was, would have been far more complete and prolonged.

The provision of an underground system as a panacea for all interruptions was pressed on the Post Office as early as 1882, and the technical possibilities had been thoroughly explored. Apart from the high initial cost, an underground cable, as then constructed, would have imposed much greater limitations on the speed of working and

would therefore have given a much smaller carrying capacity than the same number of open wires; and the conclusion was reached that to lay down an elaborate underground system solely as an insurance against occasional breakdowns was too expensive a premium to pay for the security it offered. But some ten years later, with the growth of the trunk telephone system, the open routes were becoming overloaded and the need for an underground system became urgent, quite apart from its value as a standby in the event of breakdowns. Fortunately about this time the invention of the paper-core cable removed many of the objections inherent in the older type of cable which was insulated with gutta-percha, and materially reduced the cost. It was accordingly decided to make a start with the underground system; a cable between Birmingham and London was put in hand in 1896, and apart from the inevitable interval during the war steady progress has been made. Two main trunk routes from London to the North have been completed, one via Birmingham and Carlisle to Glasgow and the other via Derby, Leeds and Newcastle to Edinburgh with an extension to Dundee; by means of these and subsidiary inter-connecting cables most of the important industrial towns in the Midlands and the North have been brought within the ambit of the underground system. Cables have also been laid to carry the traffic between London and the landing-places of the important foreign cables in Cornwall and on the South and East coasts of England. When a new underground cable is provided for the trunk

telephones, a sufficient number of conductors is usually included for telegraph purposes at a relatively small additional cost. More than £2,000,000 has up to date been spent on the telegraph underground system, and, although from a purely financial standpoint the expenditure has not been remunerative, it has given the telegraph service a stability and freedom from interruption which an overhead system, however robust its construction, could never attain.

The Post Office is responsible for some two hundred submarine cables, telegraph and telephone, connecting our shores with the Channel Islands, Ireland, the Isle of Man and the numerous islands surrounding the coasts of Scotland, as well as for two transatlantic cables and about forty others, upon which the Anglo-Continental communications depend. Most of these cables lie in shallow waters and are liable to damage from trawlers, ships' anchors and natural decay. For their maintenance and repair the Post Office owns two cable ships, the *Monarch* and the *Alert*, which are practically in permanent commission. When a cable is reported to be interrupted, the fault can be located with approximate accuracy by electrical tests, and one of the ships is dispatched as soon as practicable to the spot. The cable is grappled and brought to the surface; the faulty section is cut out, a new length is spliced in, and the cable is then restored to use. For the laying of new cables of considerable length and for repairs in deep water, for which a larger ship is required, a cable ship is usually chartered specially from one of the cable companies.

In recent years the effect upon the telegraph service of telephone competition has been growing more and more apparent ; telephone charges being graduated according to distance, local telegrams have naturally been the principal sufferers, and unfortunately they are also the most remunerative class of telegraph traffic ; local London telegrams, which at one time reached over 8,000,000 per annum, have fallen to about 800,000, and the total telegraph traffic handled by the Post Office has dropped from a maximum of 94,000,000 messages to 65,000,000. The growing popularity of the telephone trunk system is now making serious inroads on the short distance telegraph traffic, and it seems evident that as time goes on and the expansion of the telephone continues, the long distance message will become the mainstay of the telegraph system.

But while telegraphs and telephones are in direct competition over a wide field which is common to both, much has been done in other directions to unite their forces in the common cause of quick and cheap communication. The convenience of dictating telegrams by telephone to the nearest transmitting office and of accepting delivery by telephone is becoming more widely known and more generally appreciated ; the public are becoming alive to the fact that at hours when the local telegraph office is closed, by invoking the telephone telegrams can be received and dispatched which would otherwise have to be held over to the following day. In London alone, some ten thousand telegrams a day are received or delivered by telephone, and evidence is accumulating that for long distances

many business firms find a telegram, combined with telephonic acceptance and delivery, equally satisfactory and considerably cheaper than a trunk call. At nearly all rural post offices the telephone has been substituted for telegraph instruments, and telegrams handed in by the public are telephoned to the nearest telegraph centre, whence they are transmitted by telegraph in the ordinary way; the telephone circuit is usually available for public use as a telephone call office, and the system also solves the difficulty of providing trained telegraph staff at the small post offices through the country.

The characteristic of the British telegraph service, which distinguishes it from other administrations, is that it aims at giving a service of uniform quality to all places, large and small. We may compare this with two rival systems. In the United States there are two great operating companies, and in districts where they are in competition, which include the important commercial centres, an extremely rapid service is given, but where one of the companies is in sole possession the standard is below that which the British public would regard as acceptable. In Germany there is a similar differentiation but it is based upon another principle. The ordinary service is below the British standard, but the system admits urgent telegrams at triple rates and "lightning" telegrams at ten times the triple rate, i.e. thirty times the ordinary tariff; by this means a specialised service is given to the commercial community and to anyone else who is ready to pay for it. In Great Britain a maximum of forty-five minutes from office to office is aimed

at, and the actual average is much less ; the only differentiation is in favour of the Stock Exchange traffic, for which direct wires between the various Stock Exchanges are provided, giving a service equal to the best American standard and to the German "lightning" service.

Although the telegraph service has not been financially successful and is in fact a serious drain upon the profits realised by other branches of the Post Office, it may legitimately claim to have fulfilled many of the purposes for which a State-owned system was established. A uniform and expeditious service has been brought within reach of all classes of the population and has been made accessible, so far as possible, to all parts of the country, however remote and sparsely populated. There are at present some seven thousand telegraph offices in rural areas, the majority of which do not and are never likely to cover expenses. It may be safely assumed that if the telegraphs had remained in the hands of the private companies, operating under the imperious rule of the balance sheet, development would have been confined to the populous districts and attention would have been centred on the heavy commercial traffic which alone could yield a fair return. The question is often asked whether by economical organisation, without an increase in the tariff, the telegraphs could not be placed on a solvent basis. So long as wages and the prices, which govern the cost of living bonus, remain at anything like their present level, the answer must certainly be no. The extension of machine telegraphs and certain other measures in

prospect promise substantial savings, which may reduce, but cannot in themselves wipe out, the existing deficit ; to reach equilibrium a pronounced fall in the cost of living bonus, combined with a heavy increase in the tariff, would be necessary. The rapid expansion of the telephone service, besides attracting the cream of the telegraph traffic, has without doubt deposed the telegram from its position as the only means of urgent communication. But there is no sign that the day of the telegram is over, and there is something to be said for continuing to subsidise the telegraphs from the profits of other Post Office services, in preference to raising charges to a level which would stifle the telegraph business.

Chapter VI

FOREIGN TELEGRAPHS

FOREIGN cable communications were expressly excluded from the Postmaster-General's telegraph monopoly by the Telegraph Act, 1869, but the Government retain an effective control over cable policy through the Crown's rights over the foreshore, by virtue of which a Board of Trade licence is required before a cable can be landed in Great Britain. The grant or renewal of a landing licence affords an opportunity for imposing such conditions as the Government consider necessary, and has often been used to induce the company concerned to reduce its tariff or to make other concessions to the public; in some instances the landing licence has included a "control of rates" clause, under which, if the Government considers the rates charged or proposed to be charged, excessive, the difference, in default of agreement, may be referred to the arbitration of the Railway and Canal Commission.

Questions of policy relating to Imperial and foreign communications, both by cable and wireless, are referred to a Standing Committee known as the Imperial Communications Committee. This Committee is usually presided over by a Cabinet Minister and includes representatives of the fighting services, the Post Office and other civil departments con-

cerned in one aspect or another of communication problems; representatives of the Dominions are invited to attend when questions in which they are interested appear on the agenda. Upon matters of high policy the Committee's recommendations are submitted to the Cabinet; on those of lesser importance their conclusions are remitted direct to the Department immediately concerned, which is usually the Post Office, for executive action. The Committee fulfils a valuable and almost essential function in examining, with the assistance of the best expert advice, questions which are often complex and technical and occasionally raise important international and Imperial issues; inter-departmental correspondence is avoided, prompt decisions are facilitated, and it is seldom that a solution acceptable to all the Departments concerned is not reached, even though at the outset their views appear to be irreconcilable.

Since the earliest days of submarine telegraphy, free trade in cables has been the consistent policy of successive British Governments. Ample cable communication has been recognised as essential to the Imperial responsibilities and world-wide trade of Great Britain, and every encouragement has been given to the pioneer companies to lay fresh cables from our shores and to develop their systems abroad.

For many years long-distance communications were left entirely in the hands of private companies aided by the benevolent support of the Government; in some instances where new cables, which were not likely at first to be commercially remunerative, were

required for strategic or Imperial reasons, Government subsidies (which have now expired) were granted on specified conditions for a term of years. This is not the place to tell the story of the great telegraph companies; the cable map of the world is in itself an eloquent testimony to their enterprising policy and farsighted management. The Post Office is in close touch with the companies' operations and in constant negotiation with them upon such questions as landing licences, tariffs, etc. It is also the duty of the Post Office to provide the connections between the companies' cables and the inland telegraph system. Most of the companies lease Post Office wires linking the cable terminals with their offices in London and in some of the more important cities, and over these wires the bulk of their traffic passes. For the rest of the country the Post Office acts as a collecting and distributing agency, receiving from the companies as remuneration for its services one penny a word, the equivalent of the inland telegraph rate, upon the traffic which it handles. The Post Office has been traditionally scrupulous in the observance of routeing instructions, and the public is given full freedom of choice and full information as to the routes available.

The laying of the Pacific cable in 1902 marked the first important departure from traditional policy. For some years before there had been steadily increasing support for a direct connection across the Pacific between Canada and Australia, and the technical and financial aspects of the scheme had been exhaustively examined. With the

concurrence of all the Governments concerned, it was finally decided to lay a State-owned cable, which should be the joint property of Great Britain, Canada, Australia and New Zealand. The cable was completed in 1902 without a hitch at a cost of nearly £2,000,000, and is managed by the Pacific Cable Board, composed of three nominees of the Imperial Government, two members appointed by Canada, two by Australia and one by New Zealand. The cable extends from Vancouver via Fanning Island and Fiji to Norfolk Island, where it bifurcates, one branch leading to Australia and the other to New Zealand. The section between Vancouver and Fanning Island—3,200 miles in length—is the longest continuous stretch of submarine cable in the world. Starting from small beginnings, the traffic has steadily increased and for some years exceeded the cable's normal capacity; various additional links have been added, and in 1926 the main section from Vancouver was duplicated, giving two independent channels of communication along the whole route from Canada to Australia.

Before long the growing success of the Pacific cable led to a movement for the completion of an "all red" route by a State-owned cable connecting Great Britain with Canada. For a time the heavy capital expenditure, which a new transatlantic cable would entail, stood in the way. But the war provided an unexpectedly favourable opportunity. Among the German cables passing down the Channel, which were cut at the outbreak of war, were two of comparatively modern date leading

from Germany to New York via the Azores; by agreement with the French Government it was decided to take possession of them, one being provisionally allocated to France and the other to Great Britain. The intention was to lead the British cable into Penzance, to cut it again on the American side some six hundred miles from New York, and to extend it from this point to Halifax, Nova Scotia.

The Penzance diversion was effected without much difficulty, but the operation on the American side proved a tedious and hazardous undertaking. The cable ship chartered for the purpose left England early in 1917, but it was not until June that the cable was proved through from Penzance to Halifax and immediately opened for service. The submarine menace was at its height; the ship was continuously under naval escort and was confined to port by Admiralty orders for considerable periods; a number of faults had to be repaired at great depths, extending in at least one instance to three thousand fathoms, and progress was often hampered by bad weather and heavy seas. It is a tribute to the skill and seamanship of the officers and crew of the cable ship that in spite of these obstacles the enterprise was brought to a successful conclusion; that it was possible at all may be regarded as a significant by-product of the command of the sea. By the Treaty of Versailles Germany renounced her property in this and her other cables, which became vested in the "Principal Allied and Associated Powers"; the final allocation has not yet been determined, but there is no

reason to suppose that the British title to the Penzance-Halifax cable will be challenged.

Shortly after the war the Post Office purchased from the Direct United States Company a second transatlantic cable to carry surplus traffic and as a standby in case of interruption, and the two are known as the Imperial Cables. They are worked from the Central Telegraph Office in London direct to Halifax where they are operated by the Pacific Cable Board as agents of the Postmaster-General. Canadian traffic is handed to the Canadian Pacific Railway at Halifax for distribution throughout Canada. Australian and New Zealand traffic is taken by special wire direct from Halifax to Vancouver, where it passes over to the Pacific Cables. The traffic carried by the Imperial cables averages some thirteen million words per annum, of which about 60 per cent. is exchanged with Australasia, 25 per cent. with Canada, and the residue with the West Indies, the United States and a few miscellaneous destinations.

During the past twenty-five years the cost of cabling has been falling steadily ; not only have the charges for ordinary or full-rate messages, which are usually quoted as the index of cost, been reduced to almost all destinations, in some cases by over 50 per cent., but the public have benefited even more by the institution of a variety of reduced tariffs for messages subject to varying degrees of delay. It was felt that a cheap service, intermediate in speed between the full-rate telegram, delivered within perhaps two or three hours, and the mail service occupying as many weeks in transit, would

attract a large volume of new traffic which could be disposed of at times when the cables would otherwise be idle at relatively little extra expense to the cable administration. The first step was the introduction of the "deferred service," charged at half the full rate and taking priority immediately after full-rate messages. The experiment was immediately successful and produced sufficient additional business to compensate the companies for the diversion of part of the full-rate traffic. The "deferred service" led in its turn to the day letter telegram, night letter telegram and week-end letter telegram which are now offered on many of the important routes, including those to the United States and to most parts of the British Empire. These services, which are confined to messages in plain language, are usually charged at about one-third or one-fourth of the full rate, with a minimum of twenty words, and normally secure delivery within twenty-four to forty-eight hours. They have proved immensely popular, especially on the longer and therefore more expensive routes to Australia and New Zealand. In fact, the average cost of the telegrams exchanged between England and Australia via the Imperial-Pacific route is now about a shilling per word, while the full-rate charge is two shillings a word.

The last year or two have seen the completion of a number of new long-distance cables, which by means of a process known as "loading" give a much higher speed and therefore a much greater carrying capacity than was previously thought possible. At the same time, with the development

of the short-wave system, wireless telegraphy is making great strides; two of the Imperial wireless stations have recently been opened and other high-speed services are likely to follow. The combined capacity of the cable and wireless services will be far greater than the traffic at present available for them, and a general reduction of tariffs under the influence of competition may be looked for. When that occurs, it seems probable that the facilities for letter telegrams and deferred messages at cheap rates will be still further developed.

In 1921 the Post Office made an original concession to sentiment and offered a special low tariff for telegrams via the Imperial and Pacific Cables, conveying Christmas and New Year greetings between Great Britain on the one hand and Canada, Australia and New Zealand on the other. The experiment has proved increasingly popular and the lead has been widely followed by the cable companies; in the first year the Imperial Cables carried 3,800 of these messages and the number has now grown to nearly 20,000. The messages consist of a minimum of ten words for delivery on Christmas or New Year's Day as the sender desires, at a charge of 2*s.* 6*d.* for Canada and 5*s.* for Australia and New Zealand. Curiously enough, as the special tariff has become better known, a remarkable increase in Christmas greeting telegrams sent at the ordinary tariff has been noticed; many commercial firms seem to find Christmas messages to their clients and connections abroad a paying investment as well as an agreeable compliment. And they also have a romantic side; several cases

One of the most notable feats in the history of telegraphy took place on the opening of the Wembley Exhibition on April 23rd, 1924. His Majesty the King sent a message through the British Empire in the following words:—

The details of the elaborate organisation required were concerted by the Post Office, the Pacific Cable Board and the Eastern Telegraph Company, the aim being that the message should travel round the world and be returned to London in the shortest possible time. The arrangements proved so successful that the telegram was redelivered to the King on the Royal dais by a Post Office messenger in eighty seconds from the moment of dispatch, while the assembly were still applauding the actual opening of the Exhibition. The message was sent from Wembley to the Central Telegraph Office, thence direct to Halifax by the Imperial Cable, thence across Canada to Vancouver, where it passed on via the Pacific Cable to Fiji, Auckland and Sydney. At Sydney it was transferred to the Eastern Telegraph Company, which dispatched it to Adelaide and Perth, and thence via Durban, Cape Town, St. Helena, Ascension, St. Vincent and Madeira to London. It was also transmitted from Port Darwin to Singapore, where it was branched

so as to include India and the British Colonies in the Far East. The Superintendent at Aden reported that he received it on three routes within a few seconds' difference in time. It reached London via two routes in the Mediterranean and was received on an instrument in the Stadium within a few feet of the point from which it had been dispatched eighty seconds before. It had been arranged that at each link of the chain the first words of the message should be passed on to the next link the moment they were received, and it is estimated that before the last word had left London, the first word had already crossed the Atlantic and Pacific, the continents of America and Australia, and had reached Cape Town via the Indian Ocean.

Unlike the long-distance cables, the cable communications with most European countries have for many years past been retained in Government hands. In 1889, when the concessions held by the Submarine Telegraph Company expired, the cables connecting Great Britain with France, Belgium, Holland and Germany, which had been operated by the Company, were acquired by the Government, and in 1910 the Great Northern Company's cable to Norway was purchased. A large number of additional cables have since been laid to meet the growth of the Anglo-Continental telegraph business, the cost being usually shared equally between Great Britain and the Continental administration concerned. During the war the Government and military traffic reached unprecedented figures and the demand for additional wires

seemed insatiable. In December, 1914, the Post Office provided a new cable to Russia extending from Peterhead round the North Cape to Murmansk; and three new cross-Channel cables were laid to France. The Post Office now works to the Continent twenty cables containing seventy-seven wires, and by the process of superimposing and multiplex working these wires are capable of giving a much larger number of separate channels of communication. At present some 144 channels are worked, and more could be opened if and when the traffic requires.

British telegraph practice favours concentration and, with the exception of three wires operated direct from Liverpool to Paris and Havre, the whole of the Continental routes are worked from the Central Telegraph Office in London, or the Stock Exchange Office at Threadneedle Street. The policy of concentration is held to provide an equally expeditious service at a lower cost both in operating staff and in wire mileage. Continental administrations, on the other hand, prefer to spread their traffic among a large number of different centres, with the result that the Central Telegraph Office is in direct communication with twenty-nine Continental cities, including places as far off as Rome, Marseilles, Vienna and Prague. Through these centres the Government cables can reach virtually the whole of Europe and they do in fact carry some 70 per cent. of the traffic between Great Britain and the Continent. Licences have been granted to certain cable companies to conduct services with some of the more distant countries,

such as Spain, Portugal, Denmark and Sweden and the Balkan Peninsula.

The transit time of a foreign telegram necessarily depends not only upon its treatment in the country of origin but upon the efficiency of the service in the country of destination and at intermediate transmitting points. With a few exceptions, the Continental administrations do not reach a standard of service which the more exacting British public would regard as tolerable, but special arrangements have been made for a service at very high speed between the Stock Exchange Office in Threadneedle Street and the Bourses at Paris, Berlin, Brussels and Amsterdam. Urgent messages, prepaid at three times the ordinary tariff, are usually received within three minutes of the time of handing in. The principle of a special tariff for urgent telegrams has always been opposed by the British Post Office as tending to depreciate the ordinary service, but it has had to be admitted for the Continental services and on some of the long distance cables, in order to place the British trader on equal terms with his foreign competitors. It has never been introduced upon the inland telegraph system, and on the Anglo-Continental routes worked by the Post Office the urgent messages do not represent more than 8 per cent. of the total traffic.

The fundamental principles governing international telegraphy were laid down by the St. Petersburg Convention of 1875, which is still in force. Annexed to the Convention are detailed regulations which are revised at conferences of the International Telegraph Union, usually held at

intervals of five years. These regulations cover almost every conceivable point which may arise upon telegraph procedure and practice, and prescribe the maximum terminal and transit rates chargeable upon international telegrams by countries forming part of the European system; extra-European States are not subject to any limit. As the charge paid by the sender of a foreign telegram is made up of the aggregate of the rates levied by the two terminal administrations and by any transit countries (or cable companies) over whose wires the telegram passes, the importance of maintaining the rates, both terminal and transit, at a reasonably low figure will be obvious. The last conference of the Telegraph Union, which took place in Paris in 1925, was confronted with an organised movement, mainly initiated by the small States, for substantial increases in the European rates, terminal and transit. This proposal was resisted by the delegation from the British Post Office as imposing an unnecessary and unjustifiable burden upon commerce; though the British opposition was not entirely successful, it produced a marked effect upon the Conference, and most countries have been induced by subsequent negotiations to keep the rates levied upon traffic exchanged with Great Britain at approximately the former figure, and substantially below the new maxima. Consequently there are very few instances where the higher rates will involve any increase in the charges payable by the public in this country.

Chapter VII

WIRELESS SERVICES

THE possibility of transmitting intelligible signals over short distances without the aid of a wire was known to scientists as early as the middle of the nineteenth century. In 1895 during a cable breakdown the Post Office maintained communication by wireless between the Island of Mull and the mainland and between Crookhaven and the Fastnet Lighthouse. But it was not until Mr. Marconi appeared on the scene a year or two later with his striking series of discoveries that wireless began to show promise of commercial results. By 1898 a public station for communication with ships had been opened at the Needles and in 1899 communication was established across the Channel. Towards the end of 1901 Mr. Marconi succeeded in transmitting signals across the Atlantic from Cornwall to Newfoundland.

With the rapid development of wireless on the scientific side, its potentialities for strategic as well as for commercial purposes began to be realised. It soon became evident that some form of Government control would be necessary, both for the protection of naval and military communications and to enable commercial services to operate without mutual interference. With this object Parliament passed the Wireless Telegraphy Act,

1904, which was originally intended to be a temporary measure, but has remained the governing statute to the present day. The Act provides, *inter alia*, that no wireless station shall be established or wireless apparatus installed or worked in the British Isles or on British ships without the Postmaster-General's licence. From the licensing system thus established flow the powers exercised by the Post Office to control the institution of public wireless services, whether by telegraph or telephone, to regulate the activities of experimenters and to impose and collect the licence fees from which the Broadcasting service is financed.

The Act was expressly intended to encourage, and not to hamper, research and experiment, and in administering it the Post Office has aimed at giving as much latitude as possible to genuine experimenters, consistently with protecting them from each other and safeguarding the essential naval, military and commercial services from interference. For this purpose experimental transmitting licences (as distinct from receiving licences, which are obtainable by anyone) have been confined to persons who can show some scientific qualifications, and restrictions are imposed on the power of the apparatus used, according to the nature of the experiments proposed. The greater the power and consequently the range of a station, the greater are the possibilities of interference. Applications for licences for new transmitting stations of relatively high power, such as would be required for broadcasting or for commercial services, have to be closely examined with reference to their location and the

power, wave-length, etc., which it is proposed to use. These applications are considered jointly by the Post Office and the fighting services before a licence is granted and, if any important principle is involved, by the Imperial Communications Committee.

Apart from its licensing functions under the Wireless Telegraphy Act, the Post Office is principally concerned with the ship-and-shore and point-to-point commercial services. Communication with ships was the first practical application of wireless telegraphy. A discovery which enabled ships to get into instantaneous touch with each other or with the shore at distances far beyond the range of any form of visual signalling was obviously of immeasurable value for life-saving purposes, and the part which wireless played in some of the historic disasters of the sea, such as the loss of the *Titanic*, is still fresh in our memories.

It was soon recognised that to make the fullest use of maritime wireless, international agreement and co-operation would be necessary. Hence the International Radiotelegraph Convention, which was the result of an international conference held in Berlin in 1906. The Convention was revised and elaborated at a second Conference in London in 1912 and is to be reviewed again this year at Washington. The Convention affords a guarantee for the exchange of messages at reasonable rates between ships and the shore without regard either to nationality or to the wireless system employed, and for the transmission of ship messages over the telegraph systems of the contracting States. It

prescribes 600 metres and 300 metres as the wavelengths normally to be used for ship-and-shore working, and the well-known S.O.S. as the universal signal of distress. It lays down the qualifications required for ships' operators and it includes a large number of detailed regulations for the day-to-day working of the service.

With the advent of wireless, ships have become the mobile outposts of the telegraph systems of the world. Nearly every maritime nation has provided a number of coast stations, through which communication is obtainable with any part of the international telegraph system. A ship fitted with a wireless installation—and very few sea-going ships are not—can therefore exchange messages with any destination accessible through the telegraph services of the world, so long as it is within range of a coast station. The International Radiotelegraphic Convention is the foundation upon which this organisation has been built up.

Following on the wreck of the *Titanic*, an International Conference on the Safety of Life at Sea met in London at the close of 1913, and drew up a Convention, to which Great Britain became a signatory. The Convention, among other reforms, made it compulsory for ships over a certain size to be fitted with wireless, and legislation was subsequently passed to give effect to this provision. Every British sea-going ship, which conveys passengers or is of 1,600 tons gross or upwards, is now required by law to carry a wireless installation and a staff of certificated operators, varying from one to three according to the size of the ship. The Post Office

issues ships' licences and conducts periodical inspections of the apparatus to ensure that it is maintained in efficient order. The Post Office inspectors also conduct the examinations of candidates, who have completed a course of instruction at a Wireless Training School, for the Postmaster-General's certificate of proficiency, which entitles the holder to rank as a qualified operator.

The British coast stations, which were originally the property of Lloyd's and the Marconi Company, were purchased by the Post Office in 1909 and have since been operated by the Department. Eleven in number, they are spaced round our coasts in convenient proximity to the main shipping routes. Each station has a normal range of about 250 miles and is in direct connection with the inland telegraph system, and through it with the telegraphs of the world. Ships fitted with long distance apparatus, and these include nearly all the big liners, when outside the 250 mile range of the coast stations, can exchange messages with the Post Office long range station at Devizes up to a limit of about 1,500 miles. For still longer distances the great Rugby station with its world-wide range is available for the transmission of messages, but in this case the ship cannot reply or even send an acknowledgment of the receipt of the message. The charge for ship messages is 1s. 6d. a word for transmission from Rugby and 11d. a word from any of the other stations; of the total, 4d. a word is usually credited to or retained by the ship. The charges for the cross-Channel steamers and certain short-voyage ships are lower. The Post Office stations handle about 250,000

messages to and from ships each year and the traffic is steadily increasing.

An interesting development of the last few years has been the use of wireless for direction finding. If the master of a vessel is in doubt as to his position or wants confirmation of his own observations, he can call up a coast station equipped with direction finding apparatus, and for a charge of five shillings he can obtain within the space of a few minutes his true bearing, or if greater accuracy is required, he can call up two or even three stations and obtain cross bearings. Up to a range of 100 miles the bearings are usually accurate within a margin of two degrees, but if for any reason the bearing given is suspect, the station adds a warning that it cannot be relied upon. At present four of the British coast stations are fitted with direction finding apparatus and others are about to be similarly equipped. Alternatively, apparatus can be fitted on board the ship and bearings can be taken from shore stations, the position of which is accurately known, by using their normal transmissions. The value of accurate bearings in thick weather can easily be imagined and the direction finding system is becoming increasingly popular.

In communication with movable objects, such as ships and aeroplanes, wireless has the field to itself. But when we pass to the public telegraph services, conditions are different. The old-established cable companies are in possession, and wireless has to face keen competition, of which the ultimate results cannot yet be foreseen. From the day in the autumn of 1901 when Mr. Marconi succeeded in

transmitting the letter "S" across the Atlantic, it was clear that the opening of long distance wireless services was only a matter of time. But immense difficulties had to be faced and it is not surprising that some years elapsed before the Marconi Company, operating under licence from the Post Office, was able to conduct a satisfactory wireless service between England and North America.

At the same time, the conception of an Imperial chain of State-owned wireless stations, linking the outlying parts of the Empire with the Mother Country and with each other, began to take shape. Its strategic importance was emphasised by the Committee of Imperial Defence and it received the imprimatur of the Dominion representatives at the Imperial Conference of 1911. The scheme passed through many vicissitudes before it emerged in its present form. The location of the stations has been materially altered, and the progress of wireless science has enabled their range to be increased and their size and power to be reduced. The stations in England will be owned by the State and operated by the Post Office, in conformity with the original plan, but the policy of the Dominions has veered towards management by Companies, acting under licence or through contracts with the Governments concerned.

At the outbreak of the Great War, a contract with the Marconi Company for a chain of six long-distance stations had been concluded, but the special needs of war communications, which at that time necessarily dominated the situation, pointed rather to a larger number of small stations in strategic positions

of no commercial importance, and the contract was cancelled. After the war, the question of Imperial Wireless again came to the front. An expert Committee, appointed by the Government, advised the construction of a series of stations, spaced about 2,000 miles apart, which would handle terminal traffic and would also serve as stepping-stones for the services to the distant parts of the Empire at times when direct working would be impracticable. But there was a strong feeling in the Dominions in favour of direct communication without intermediate points, which was known to be technically practicable but would entail much more powerful, and therefore more expensive, stations. Eventually the Government decided to defer to the views of the Dominions and it was arranged that stations should be erected in Great Britain, India, Australia and South Africa of sufficient power to ensure direct intercommunication.

A start had already been made with the construction of the stations in England (at Rugby) and South Africa, when Mr. Marconi produced an entirely novel system, which has come to be known as the "Beam." The preliminary experiments appeared so promising that the Imperial and Dominion Governments decided to give it a practical trial. Contracts were placed with the Marconi Company for the erection of two pairs of Beam stations in Great Britain. One pair, with the transmitting station at Bodmin and the receiving station at Bridgwater, will take the Canadian and South African services, while the other pair with the transmitting station at Grimsby and the receiving

station at Skegness, will serve India and Australia. At the same time similar contracts for the corresponding stations were concluded by the Dominion authorities.

The Canadian service was opened in October, 1926, and the Australian service in April, 1927. The services with South Africa and India are expected to be working by the summer of 1927. Each of the stations in Great Britain is connected by direct wire with London and the operating will be concentrated at the Central Telegraph Office. During favourable atmospheric conditions astonishing speeds, running up to 250 words a minute in both directions simultaneously, have been attained.

The Beam system was the first organised practical application of short-wave wireless to long distance communications. Its distinctive feature is that the etheric waves emitted by the transmitting station, instead of radiating in all directions, are concentrated, like the beam of a searchlight, in the direction of the receiving station. The beam being, so to speak, focused upon its objective, great distances can be covered with a minute fraction of the power which the long-wave system would require. As compared with the high power stations, the Beam stations have the great merit of cheapness. The stations in this country for each of the Dominion services, including both sending and receiving units, cost about £60,000, while from first to last the cost of the Rugby station came to nearly £500,000.

So long as the Beam system is working smoothly it eats up traffic at a prodigious rate. But it has its

limitations. The contract with the Marconi Company guarantees a working average ranging from eighteen hours a day in the Canadian service down to seven hours a day on the Australian route. For a varying number of hours every day the signals are unreadable owing to "fading" or atmospheric conditions, and no means have yet been found to predict either the incidence or the duration of the blank periods. For deferred and other classes of telegrams, which are accepted at cheap rates subject to an explicit liability to delay, this is of no great moment, but it creates a serious problem in the disposal of full-rate messages, which are presumably urgent. If the interruptions are short, an accumulation of traffic can be quickly cleared off with high-speed working, but with longer intervals diversion to other routes may be inevitable.

The Beam is essentially a point-to-point means of communication and is not adapted for such purposes as the broadcasting of news or commercial information or the distribution of naval instructions. In view of these limitations and of the restricted number of hours during which the Beam services can be relied upon, the Government decided to complete the great Rugby station for strategic and Imperial purposes, while adopting the Beam for direct communication with the several Dominions.

The Rugby station was designed by a Commission of experts, appointed specially for the purpose and working in close conjunction with the Post Office Engineering Department. At the present moment, it is probably the most powerful wireless station in the world, having an output of the order of 1,000

kilowatts as compared with the 50 kilowatts of the Broadcasting station at Daventry. It occupies a site a mile and a half long by a mile wide; the antennæ are three miles long and are supported by twelve steel masts, each of which is 820 feet high. The valve system of transmission is used and the technical equipment embodies a number of ingenious electrical devices which are unique in wireless engineering. In addition to the telegraphic equipment, the station is fitted with apparatus for long distance telephony, which the reader may or may not be interested to learn employs the single side band suppressed carrier wave system of transmission.

As we have seen, the principal purpose of Rugby was to provide a reliable channel through which naval and military messages, British news and other matters of Imperial interest could be distributed over any part of the ocean or to any of the scattered territories which form the British Empire. It was not primarily a commercial venture and it will probably have to rely upon the revenue derived from the Anglo-American telephone service to pay its standing charges rather than upon the receipts from its telegraph services.

At present Rugby sends out three times daily the British Official News Service, which is compiled by the Foreign Office and is at the disposal of ships and newspapers in any part of the world. It also broadcasts at an agreed charge an unofficial News Service to which most of the ocean liners subscribe, and arrangements are being made to broadcast Greenwich Mean Time at stated hours for the benefit of shipping in distant seas. A service which

is occasionally of great value, but has a necessarily limited scope, is the transmission of private telegrams to ships fitted with long distance receiving apparatus, when they are beyond the range of any other station. To ensure that they are picked up by the ship required, these messages are sent out twice at intervals of twelve hours. While there are certain spots, particularly in the Pacific and off the south-west coast of Africa, where the reception of Rugby is sometimes poor, the reports in general are favourable and complaints of failure are rare. When necessary, Rugby can be used for point-to-point services with distant places, and for some time past it has carried the Anglo-Egyptian service during part of the day.

When the Government decided to retain the Empire services in its own hands, it agreed to grant licences under suitable conditions to private enterprise to conduct wireless telegraph services to foreign countries outside the continent of Europe. As regards Europe, the services required were to be divided between the Post Office and private enterprise, an option being reserved to the Government to take over the whole of the services at specified intervals. Licences have accordingly been granted to the Marconi Company for extra-European services and for services to France, Austria, Switzerland and certain other European states.

Besides Rugby and the Imperial Beam stations, the Post Office has a station at Cairo and point-to-point stations in Great Britain at Leafeld near Oxford, Stonehaven and Northolt, the receiving units being concentrated in a single station at

St. Albans. The Leafield and Cairo stations formed part of the original Imperial Chain and were remodelled after the war. They have since been used for a regular service between England and Egypt, Palestine, Mesopotamia and neighbouring countries. The Cairo station is now to be sold to the Marconi Company and the Egyptian services will be transferred with the station. Leafield, Stonehaven and Northolt are occupied with a number of Continental services, the more important of which are with Italy, Poland, Hungary and Czecho-Slovakia. The Continental, the Beam and the Rugby services are all operated by a system known as remote control from the Central Telegraph Office in London. In other words, the signals are sent to or received from the distant point by operators manipulating their instruments in London without retransmission at the wireless stations through which they pass.

So long as the cross-Channel telegraph cables have ample spare capacity, as they have at present, the practical value of wireless services to the continent of Europe is very questionable. Under the International Telegraph Convention, the European rates by wire and wireless are the same, and, so far as the countries bordering on the Channel seaboard are concerned, wireless is no quicker and is more liable to interruption than the cables. To the more distant parts of Europe, communications by wire may have to transit several countries and often undergo a number of retransmissions. Wireless avoids the risks of delay at intermediate points and can therefore give a quicker service, while the saving of transit

rates yields a better terminal return. But unfortunately the traffic to each of these States is small, with a pronounced peak load, and the experience of the Post Office indicates that the margin of profit, if any, is a very narrow one.

The place which wireless is ultimately destined to fill in international telegraphy must still be a matter of speculation. The enormous strides which it has made in the last few years have encouraged some of its more ardent supporters to predict a world-monopoly and have tended to obscure the solid, if less spectacular, advances in cable design and construction. Certainly the modern system of high speed working has virtually solved the problem of secrecy, and short wave wireless has opened the way to long distance services at a capital cost which is relatively insignificant in comparison either with cables or with the powerful long wave stations. If these low costs could be combined with continuous working, irrespective of time and season, wireless would be in an almost impregnable position. But at present its liability to interruption is a serious handicap in competition with the stability of the great cable systems, at any rate for the urgent full rate messages which are the cream of telegraph business.

But there is a large and only partially explored field, where an intermittent service is at no disadvantage, in the development of the letter telegram and other forms of deferred messages. A beginning has been made in this direction on the Canadian Beam service by the institution of post letter telegrams at $1\frac{1}{2}d.$ per word with a minimum of twenty

words. These messages are transmitted by post at each end and by wireless intermediately, and their popularity suggests that there is scope for the introduction of new classes of non-urgent letter telegrams, combining a low word rate with a high minimum charge.

Wireless Telephony

From telegraphy to telephony was a natural and logical step in the march of wireless. During the war, wireless telephony was tried with encouraging results for communicating with aeroplanes in flight, and after the Armistice experiments on a more elaborate scale began. Then came the avalanche of Broadcasting which originated in the United States and ultimately descended upon almost every civilised country. Finally this year has seen the opening of a public telephone service across the Atlantic.

Wireless telephony, being dependent on favourable etheric conditions, is necessarily less stable than wire telephony, which is impervious to normal atmospheric disturbance. Telephony also monopolises a wide wave band, in fact considerably wider than a telegraph service requires. For these reasons the principle has been generally accepted both by the British Post Office and foreign administrations, that wireless telephony should not be used where a telephone service by wire is practicable, e.g. over land or across narrow seas, such as the English Channel, which can be bridged by submarine cable.

For a long time a transatlantic service has been the dream of telephone engineers. In 1923 the

American Telephone & Telegraph Company gave a successful demonstration of speech from New York to a large audience assembled in London. Since then the Company's engineers and the engineers of the British Post Office have been jointly tackling the many obstacles which had to be surmounted before a service of commercial standard could be opened to the public.

Long distance telephony by wire, and still more by wireless, has been made possible by the invention of the thermionic valve, which is familiar on a small scale to users of Broadcast services. On a much larger scale the valve performs the same function of amplifying the voice over long distances. Although the transmitters on the Anglo-American telephone service are four hundred times more powerful than those installed in the ordinary Broadcasting station, the signals received 3,000 miles away on the other side of the Atlantic are only about one-thousandth of the strength of a broadcast signal. This gives some idea of the magnification required to produce intelligible speech.

In order, so to speak, to economise ether space, transmission and reception are worked on the same wave length. This involves the use of a delicate switching apparatus which is controlled by the voices of the speakers. When London speaks, his circuit to New York is switched on and the New York-London circuit is switched off. As soon as New York begins to reply, his voice automatically reverses the switch, so that the New York-London circuit is switched on and the London-New York circuit temporarily cut off.

When London calls New York, the speaker's voice currents pass through underground cables to the Trunk Exchange near St. Paul's Cathedral whence they are carried by the trunk cables to the Rugby station. At this point they are converted into wireless waves which pass across the Atlantic to the receiving station in Maine, where they are transferred to a land line 500 miles long leading to the New York Exchange and thence to the subscriber's telephone. When New York replies, the speaker's voice is carried to the New York Exchange and thence over underground cables to the wireless transmitting station on Long Island, seventy miles from New York. Here they are transformed into wireless waves and are transmitted to the British receiving station near Swindon, where they are reconverted and pass along underground cables to the London Trunk Exchange and thence to the subscriber's office. Thus, although the conversation is unbroken, the voices of the two speakers travel along paths several hundred miles apart.

It was not until the Rugby station was completed at the end of 1925 that conversation in both directions became practicable, and from that time onwards the engineers at both ends have been engaged in perfecting the transmitting and receiving apparatus and the connection between the radio link and the land lines. The service was successfully opened to the public on January 7th, 1927. At first calls were limited to the metropolitan areas of London and New York, but they have been gradually extended until any telephone subscriber in Great

Britain can now communicate with any subscriber in the United States of America.

At times the atmospheric and the fading effect which supervenes about sunset make conversation difficult and occasionally impossible. But on most days speech is as easy and intelligible as between two persons in the same town. The charge was fixed at the outset at £15 for a conversation of three minutes with £5 for each additional minute. When experience has been gained of the volume of traffic and costs of operation, a reduction may be practicable, but the plant costs are necessarily heavy and the five hours' difference in time between London and New York makes the effective working day abnormally short. The station at Rugby cost nearly £500,000 and a similar station is in use at the American end; in both countries separate receiving stations and long and expensive trunk lines are dedicated to the sole use of the service. Moreover, the fee includes a valuable privilege which is not given on the Inland or Continental Trunk Services. The caller may specify a particular person with whom he wishes to speak, and if this person or an acceptable substitute cannot be traced, a charge of £2 only, instead of £15, is made towards the cost incurred in endeavouring to find him.

Another striking achievement of wireless telephony in rather a different sphere is the Broadcasting service. The history of Broadcasting during the last four years, fascinating though it is, is not within the scope of the present volume, but the Post Office has throughout been intimately associated with its administration. The Postmaster-General, as the

Licensing Authority under the Wireless Telegraphy Act, is responsible for the framework of the Broadcasting organisation and for the exercise of such supervision as the Government must necessarily retain. It was felt from the beginning that to secure the best results Broadcasting should be in the hands of a single authority vested with a duly safeguarded monopoly, and there was general agreement that a Government Department would be a singularly unsuitable agency for the purpose. Certainly the Post Office had no ambition to assume responsibility for Government concerts or to hold the scales between the advocates of classical music and educational lectures and those who clamour for a jazz band.

Hence the formation of the British Broadcasting Company, the capital of which was mainly subscribed by a few of the leading manufacturers of wireless apparatus. The Company was not intended to be a permanent solution, and its licence was limited to two years, afterwards extended to four. It is agreed on all sides that its administration has been a conspicuous success. While maintaining a respectable standard, it has managed to adapt its programmes to the varied and often conflicting tastes of an audience which now runs into millions, and under its auspices Broadcasting has developed from a mere toy to a force, the possibilities of which cannot yet be foreseen.

On the termination of its licence in December 1926, the Company was succeeded by the British Broadcasting Corporation. The Corporation was constituted by Royal Charter and consists of five

Governors, who are appointed by the Crown and hold office for five years. The original Governors were deliberately selected by reason of their personal qualifications and not as representatives of any specific interests. With the assistance of the staff of the B.B.C., which the Corporation very wisely took over, the Governors will control the policy and the day-to-day administration of the Broadcasting service. It has been suggested by a few critics that the Corporation will be little more than an appanage of the Post Office. In the eyes of others the Corporation is the beginning of a new method for the organisation of Government-owned public utilities. Neither description is true. In setting up the Corporation, the Government intended that it should be vested with as much freedom as Parliament could be persuaded to concede, and the Governors have been clothed with full and unfettered powers to manage their own business. But the scheme was devised for the solution of the peculiar problems of Broadcasting and within these limits alone it should be judged. Unless driven to intervention on major issues by Parliamentary action, the functions of the Postmaster-General will practically be limited to providing the Corporation with revenue and deciding upon any application for the licensing of new Broadcasting stations which the Governors may submit.

The present Postmaster-General has described himself as "the policeman of the ether." It is his duty to regulate the traffic so as to avoid mutual interference and as far as practicable to find room in the congested ether for the ever growing demands of the various forms of wireless services. The power

and wave lengths of the existing Broadcasting stations have been carefully planned with this object, and the same considerations will apply to any new stations which the Corporation may desire to construct.

The funds required to finance Broadcasting are mainly derived from the licence fees paid by the owners of receiving sets. Under an agreement between the Corporation and the Postmaster-General, the Corporation will receive an annual revenue from the Post Office, calculated on a sliding scale, which is graduated according to the number of licences taken out by the public. In their first year the Corporation will probably receive an income of about £800,000 from this source, and this will gradually rise year by year so long as the number of licence holders continues to increase. The Post Office undertakes the issue of licences, the collection of the fees and the much more troublesome business, the pursuit and, if necessary, the prosecution of defaulters. Nearly $2\frac{1}{4}$ million licences are current which suggests that evasion is not systematic and that the public generally consider that they are getting good value for their money.

Chapter VIII

THE TELEPHONES

THE telephone made its first appearance in England just fifty years ago. After a more than usually troubled infancy, which was probably one of the causes of its belated growth, it has now emerged into a vigorous manhood. Its early years were disturbed by the attentions of innumerable committees and embarrassed by frequent changes of Government policy. Opinions may still differ as to the wisdom of the ultimate solution of a State monopoly, but no one would wish to revert to the so-called competitive system or to revive the controversies between the Government, the municipalities and the companies, which marked the first thirty years of the British telephone service.

The connection of the Post Office with the telephone may be said to date from the far reaching judgment of the High Court in 1880, which laid down that a telephone is a telegraph within the meaning of the Telegraph Acts and that telephonic communications are therefore within the Postmaster-General's monopoly. The Government of the day, reluctant to extend the field of State activities, which they held should supplement rather than supersede private enterprise, rejected the obvious policy recommended by the Post Office of developing the telephone as a national service in close conjunction

with the State telegraphs. But they were alive both to the danger to the telegraph revenue from the advent of a formidable competitor and to the possibility of a powerful monopoly growing up, which would eventually have to be bought out by the public purse. The Government therefore decided to grant licences to the telephone companies, but to insist on a number of restrictions, designed to protect the telegraphs though they proved an effective bar to the development of the new service. The companies were required to pay the Government a royalty of 10 per cent. on their gross receipts, which was not in itself unreasonable, but their operations were also restricted to isolated areas with a radius of not more than four or five miles, while the construction of the trunk lines required to give intercommunication between these areas was retained in the hands of the Post Office. At the same time the Post Office was authorised to open exchanges, but only to the extent necessary to give an effective weapon for negotiations with the companies.

As might have been expected, these restrictions which were crippling the service, soon produced an outcry in Parliament and the Press, and in 1884 some important concessions were made. Licences were offered freely even in districts where the Post Office were already operating; the restrictions upon exchange areas were withdrawn and the various companies were authorised to construct their own trunk lines; but the embargo upon active competition by the Post Office was maintained. In short, an era of free trade in telephones was fore-

shadowed. But until the principal patents expired in 1891, effective competition was impossible and the National Telephone Company had by then either bought up or extinguished its rivals and secured a virtual monopoly.

As the Company's system grew, the lack of wayleave powers, which was a longstanding grievance and a fatal handicap to an efficient service, became a burning question. The Government, in pursuit of its policy of protecting the telegraphs, had consistently refused to grant the telephone companies powers, similar to those exercised by the Postmaster-General under the Telegraph Acts, to place poles or underground lines in streets, public roads or on the railways, and the companies were therefore driven to make individual bargains, often at exorbitant rates, with road authorities and property owners.

By 1892 public dissatisfaction with the cost and quality of the service provided by the National Telephone Company became acute; it was alleged that extortionate rates were charged for an inferior service which was being starved to yield profits on a heavily watered capital; the Company admitted that the service was bad but threw the blame upon the denial of wayleave powers and upon other Government restrictions. At the same time the Government was becoming alarmed at the growing effect of competition upon the telegraph receipts.

A new policy was the outcome. The Government decided to purchase the trunk wires, partly in order to secure for the public purse the profits of the trunk service as some compensation for the

diversion of telegraph traffic and partly to enable the Post Office to develop energetically the trunk system through the statutory wayleave powers which the Postmaster-General alone possessed. The National Company's general licence was surrendered and superseded by licences for specified districts, known as "Exchange areas," to which its operations were in future to be confined. Outside these areas, the conduct of the telephone service was placed entirely in the Postmaster-General's hands, and licences to other Companies, if any were granted, were to be restricted to particular towns and to be conditional upon the approval of the municipality concerned. In return for the acceptance of these conditions, Parliament authorised the Postmaster-General to confer on the National Company his wayleave powers under the Telegraph Acts (except upon railways) in the Exchange areas assigned to them; but this concession lost much of its value through the local authorities being given a right of veto and therefore of dictating their own terms. A number of minor but useful reforms, mainly designed to facilitate intercommunication between the telephone and other Post Office services, were at the same time introduced. The delimitation of the Exchange areas entailed prolonged negotiations, the Company aiming at large areas as protection against municipal competition; but an agreement was finally reached in March, 1896, and the trunk system passed to the control of the Post Office, the purchase price being £459,000.

The purchase of the trunks was a decided step forward and solved some of the more pressing

difficulties, but the general hostility to the Company's administration continued and was intensified by the monopolistic position which it had acquired in the Exchange areas under the agreement of 1896. An influential movement sprang up in favour of the Government purchasing the local telephone system, as they had purchased the trunks, or at least intervening to the extent of limiting the Company's dividends and fixing maximum rates. Several important corporations were anxious to embark upon municipal telephone systems in competition with the Company, and other municipalities which never contemplated a system of their own, attempted to use their powers of veto to exact high wayleave rentals and to impose other conditions as to tariffs and supply. In some cases the Company failed to obtain underground wayleaves at any price, and where agreements were ultimately negotiated it had to submit to onerous terms. Under these conditions it is not surprising that the telephone service failed to make the headway which the public had a right to expect, and there was a general feeling that the policy of 1896 had broken down.

A Select Committee appointed in 1898 reported in favour of active competition with the National Company both by the municipalities and the Post Office. The Government adopted their report and the Telegraph Act 1899 empowered local authorities to defray the cost of a local telephone service from the rates. The practical effect of the new policy was to limit competition to municipalities and to confine the Company to those areas in which it was already entrenched, thus throwing on the

Postmaster-General the duty of serving other parts of the country.

The experiment of municipal competition was not a success; some sixty local authorities made enquiries as to licences and thirteen licences were granted, but only six were taken up and five of these were surrendered within a few years, the local system being sold either to the Post Office or to the National Company. The only municipal system which still survives is that of the City of Hull. Even with the limited development of the telephone service as it was twenty-five years ago, the local authority's area was, as a rule, much too small to constitute an efficient unit for telephone purposes, and it soon became obvious that the Company, with its accumulated experience and the advantages of being first in the field, could offer a better and cheaper service than the local authority. Meanwhile in conformity with the policy announced in 1899, the Post Office was engaged in developing its provincial system and in making preparations for the opening of the Post Office London service.

At the time the Company was at loggerheads with the London County Council over the underground wayleaves in the London Area, which were now indispensable for further expansion, and the negotiations ultimately broke down, partly owing to the high rentals demanded but principally because the Council insisted upon a reduction in the Company's tariff as a condition of any agreement. This deadlock offered a favourable opportunity for the Postmaster-General to secure from the Company a number of concessions, such as intercommunication

between the Post Office and the Company's system, and to arrange terms upon which the Government would take over the Company's property when its licence expired ten years later.

An agreement was concluded in November, 1901, which provided that the Postmaster-General should supply at agreed rentals such underground wires as the Company required, that the rates charged by the Company and the Post Office in the London area should be identical and should include free inter-communication between the two systems, and that the Company should dispose of its plant to the Post Office, on the termination of its licence in December, 1911, on "tramway" terms, i.e. at the value of the property less depreciation, with no allowance for profits or goodwill. So far as London was concerned this agreement virtually marked the end of "competition" before it had in fact begun, and it was opposed by a number of municipal bodies on that ground. But it was approved by Parliament, and it was certainly at least as advantageous to the Post Office as it was to the Company and saved both parties the expense of an extensive duplication of plant.

The London agreement paved the way for a similar Provincial agreement which was concluded in 1905, and the Government thereby acquired the option of taking over the whole telephone service of the country at the end of 1911 at the then value of the plant which it acquired. When the time came, the Government decided to exercise the option, and the National Telephone Company's business was transferred to the Post Office on 1st January, 1912.

The settlement of the purchase price was referred to the arbitration of the Railway and Canal Commission which awarded the Company £12,470,264, as compared with its original claim of £20,934,100.

Ex post facto criticism is an easy and tempting occupation, and it must be admitted that the handling of the telephone problem in its early days by successive Governments offers an ample target. Up to 1900 at any rate, the dominant features of Government policy, which at times was imposed upon rather than initiated by the Post Office, were to avoid at all costs the establishment of the telephone as a State monopoly and to encourage competition among the Postmaster-General's licencees. Ministers foresaw that sooner or later a State system was a probable, if not the inevitable, solution, and with the precedent of the telegraphs before them, they were bent on preventing the consolidation of a lucrative business which would ultimately have to be purchased at exorbitant cost.

For this purpose competition was a useful instrument; the fact that competition, however salutary in other spheres, is fatal to an efficient telephone service was not appreciated. If the rival systems enter into working agreements, providing for intercommunication (which to the telephone user is a *sine qua non*), uniformity of operating methods, standardisation of plant and other essentials to a satisfactory service, the competitive element virtually disappears; while if vigorous and undiluted competition is maintained, the probability is that both systems are starved into inefficiency. But in any event operating and maintenance costs

are increased, an economical engineering lay-out on scientific lines is impossible and wasteful duplication of plant is inevitable. It will be noted that when the policy of all-round competition was announced in 1899, the municipalities, who had been its principal sponsors, were chary of embarking upon it, and those which made the experiment abandoned it within a few years.

After the purchase of the trunk wires, everything pointed to the establishment of a State system when the National Company's licence expired in 1911. Even if the Company's service had been efficient, which it admittedly was not, it is highly improbable that Parliament or the country would have consented to leave an essential public service permanently in the hands of a profit-earning company and still less to confer upon it the necessary powers of opening streets and running overhead wires. The Government was therefore confronted with two problems, firstly to obtain an option to purchase the Company's business on reasonable terms at the termination of their licence and secondly in the interim to secure a telephone service which would meet the growing requirements of the public. So long as the Company was at the mercy of local authorities, many of whom used their powers of veto in a spirit of general hostility to a private undertaking or as a lever to secure tariff and other concessions, a respectable service was out of the question. There is every reason to suppose that, if the Government had adopted at a much earlier date the policy embodied in the Agreements of 1901 and 1905, they could have secured equally favourable terms of purchase,

and in the meantime the Company would have had the necessary facilities for the development of an efficient service. As it was, the one satisfactory result was that the Post Office was able to take over the Company's business at a price which corresponded pretty closely with the value of the plant acquired.

When the transfer actually took place, the public were probably blissfully unconscious of the change, but the Post Office was under no illusion as to the difficulties ahead. While *in articulo mortis*, the Company had naturally been chary of spending capital on additional plant, where it was not immediately revenue-earning, and of replacing material which the Post Office was bound to take over. At the same time they canvassed for new subscribers up to the limit of the spare plant existing. Consequently a considerable portion of the transferred plant was not of a modern or efficient type, renewals on a large scale were necessary, and in many areas there was little or no margin of spare wires or switch-board accommodation. By the outbreak of war much had been done towards replacing obsolete plant and amalgamating the two systems, but there were still heavy arrears to be overtaken. During the next four years construction was necessarily confined to works required for military and other national requirements, while at the same time the margin of spare plant was being steadily absorbed by current demands. At the Armistice spare plant in about three-fourths of the country was exhausted, whether in the form of exchange plant or of underground cables or of both, and renewals, estimated to cost £3,000,000, had had to be deferred. To make

matters worse, the fictitious trade boom of 1919-21 produced a telephone boom of equal virulence, which the Post Office would have welcomed at any other time.

It was clear that a general survey of the plant requirements through the country was necessary, and that this would have to be followed by a construction programme on a much more ambitious scale than the Post Office had ever previously undertaken. Orders were placed for additional equipment to meet the most urgent needs, but the telephone manufacturers, like other industries, were severely hampered by difficulties in obtaining supplies of material and in getting their factories restarted on their normal work. Delivery periods quoted by contractors were ludicrously long as compared with the pre-war standard, but they proved to be ludicrously short when compared with actual performance, and it was not until 1921-22 that the fruit of the earlier orders matured in large quantities. In the meantime there were many thousands of applications from new subscribers which could not be executed owing to shortage of plant, and the telephone service became the subject of excusable, but not altogether reasonable, execration which only the tedious process of reconstruction could silence.

It may be of some interest at this point to trace through its various stages the planning and construction of a new Exchange. First of all, a forecast is prepared, not merely for a few years but for a generation ahead, showing the total number of lines estimated to be required at various periods and their distribution between different parts of the area

concerned. This forecast, known as a development study, is founded upon a detailed survey of each street, supplemented by any available information as to prospective changes in the character of the district likely to affect the telephone demand, such as the development of waste land, the planning of housing estates or the erection of blocks of flats or new factories. Upon the development forecast the delimitation of the Exchange area, the site and size of the Exchange and the lay-out of the cabling system will depend; accuracy is therefore important, though for the later years the forecast must be a matter of intelligent speculation; the price of serious error is usually duplication of work and waste of money.

On the basis of the forecast, the "telephone centre" of the area is worked out and the ultimate size of the Exchange and the initial number of lines to be provided is fixed. A site is then sought, which in order to reduce the cabling costs should be as near as possible to the "telephone centre," and eventually purchased. Meanwhile the Office of Works, which is responsible for the design and construction of the Exchange building, is preparing plans in consultation with the Post Office engineering and traffic officers, and the building contracts are then let.

The design and specification for the Exchange equipment are prepared by the Engineering Department on the basis of traffic data, which include estimates of the number of lines, the daily number of calls per line, the peak-load and other factors which govern the design and quantity of plant. An order for the whole equipment is then placed with

one of the telephone manufacturing firms, generally as the result of competitive tenders. The contracts are so timed that the completion of the building approximately coincides with the date at which the equipment is ready for installation.

Concurrently with the construction of the Exchange the local engineers are engaged upon the cabling system. From the Exchange radiate the main cables, each of which in the central area of a large city may carry up to 2,000 wires, and the main cables branch off into subsidiary cables which are led into the subscribers' premises either direct or through distribution poles carrying overhead wires. In the large towns an extensive system of junction wires connecting each Exchange with its neighbour has also to be installed and is one of the factors which makes the telephoning of the great cities abnormally expensive.

When the Exchange equipment has been tested out and the cabling system is completed, the operating staff is organised, and a date is fixed for opening. To avoid interruption of the service, the actual transfer of all the lines takes place simultaneously and almost instantaneously; within two or three minutes of disconnection from the old Exchange, the subscriber is able to call up from the new. For the first day or so a number of minor adjustments are usually required, and the Exchange then settles down smoothly to its life of twenty-five or thirty years.

The extensive programmes of the past few years have now succeeded in clearing off the war arrears, but the current expansion of the service requires an

addition of about 80,000 lines per annum. The Post Office aims at making a start on a large Exchange some five years before the Exchange is due to be opened, largely on account of the difficulty of obtaining a suitable site within the limited area of choice which is available. At any one time therefore there are schemes on the stocks, either in the preliminary stages of design or in actual course of manufacture, to meet the growth of the system for several years ahead. If the demands of new subscribers are to be promptly met, this advance provision must be adequate and up to date, while reasons of economy require that it should not be excessive.

The milestones which have marked the progress of telephony have usually passed unnoticed by the general public who benefit by the successive improvements, but the latest and perhaps the most far reaching achievement of telephone engineering—the automatic Exchange—is one in which the telephone user is intimately concerned. This ingenious and complex mechanism is designed to give intercommunication, without the intervention of an operator, between all the subscribers within what is called the automatic area. The automatic area may range from a small village with a dozen telephones at one end of the scale to London, which will ultimately have between two and three hundred Exchanges and over a million subscribers, at the other. By rotating a small dial attached to his instrument to the correct sequence of figures the caller is connected automatically to the number required, or by moving the dial to a par-

ticular number he can call an operator if he wants assistance or a service requiring human action, such as the trunk service. For other purposes also the automatic apparatus is an equally effective substitute for the operator; it disconnects when the conversation is finished and if the number required is a private branch Exchange with perhaps 100 lines it selects and connects the particular line which happens to be free at the moment; it indicates to the caller when the line is engaged or out of order, and it registers a call against the subscriber when it is completed, but not when it is ineffective. Professor Fleming at the Royal Institution described the automatic telephone apparatus as the nearest approach of machinery to the human brain.

Automatic equipment is necessarily expensive. In central London the initial cost may be as much as £30 a line as compared with £14 for a corresponding manual exchange. At present the additional plant costs practically neutralise the savings in operators, but in time standardisation and mass production ought to bring down manufacturing costs and the automatic should then show an appreciable saving over the manual system. In other respects it offers distinct advantages; the speed of connection and disconnection, and therefore the calling capacity of each line, is greater; mistakes, which are inevitable so long as the human element is involved, are avoided; if the caller gets a wrong number, the fault is his own and he cannot shift the blame on to the long suffering and much abused operator. Last, but not least, disputes as to the accuracy of the registration of calls are practically eliminated.

The Post Office opened its first public Exchange on the automatic principle at Epsom in 1912 and in the succeeding two years five other towns were similarly equipped. At the outset, several different types were tried in order to obtain practical tests of the performance of each, and eventually the Strowger system was adopted as the standard. Since the war the provision of automatic equipment has become the accepted policy in all areas where the traffic conditions are suitable; some forty-eight automatic Exchanges are now working and are reported to be welcomed locally and to be a great advance in point of convenience and efficiency upon the manual system. Such important multi-exchange areas as the cities of Edinburgh, Leeds and Sheffield are entirely telephoned on the automatic principle, and a start will be made in Manchester and Birmingham within the next two or three years. At present the Post Office has automatic schemes in forty-nine areas either in course of manufacture or in the preliminary stages of planning and design.

London, owing to its size and the vast number of subscribers, is a problem in itself. To develop a single automatic system covering a densely populated area of over 300 square miles and ultimately providing intercommunication between more than a million subscribers is obviously an engineering operation of the first magnitude. As a preliminary step, a delegation of engineers and traffic experts was despatched to examine the methods and systems in operation in the great towns of America. After exhaustive investigation it was ultimately decided to instal automatic plant of the Strowger type coupled

with what is known as Director equipment—a mechanism specially adapted to meet the requirements of large cities. A satisfactory agreement was reached with four of the principal manufacturing firms in Great Britain under which the Post Office obtains the use of all the patents involved on reasonable terms, and the detailed designs have been threshed out by the engineering staffs of the Post Office and of the manufacturers working in co-operation. The first three automatic Exchanges, Bishopsgate, Holborn and Sloane, are expected to be open in the summer of 1927, and others will quickly follow.

The Post Office policy is to instal automatics where new Exchanges are required either to provide for expansion or in substitution of manual Exchanges which are worn out and due for replacement in the normal course, but not to scrap manual Exchanges of a modern type which still have an effective life before them. It will therefore be some twenty or twenty-five years before the conversion of the London area is complete. In the transition stage automatic and manual Exchanges will be working side by side, and an ingenious apparatus, installed in the manual Exchanges, will give intercommunication between them, just as if the whole system was of a uniform type.

A successful telephone service depends as much upon efficient operators as upon efficient plant. So long as the human element forms a link in the complicated chain of processes which result in a telephone call, mistakes are inevitable. But it is safe to say that only a small percentage of the abuse

and gibes which fall upon the telephone girl find the right target. Fortunately she is trained to act as a safety valve for the caller's irritation and to accept without retort complaints which should properly be laid at the door of the apparatus, her colleague in some other Exchange, or very frequently the complainant himself. It is remarkable how often a visit to a large Exchange during the busy period of the day mollifies the views of the most hostile critic.

Candidates who pass the ordeal of the Selection Committee—in London only about 20 per cent. are accepted—are then put through a systematic course of training in the Telephone School, after which they are allowed to take charge of the lighter circuits. A good operator requires a combination of many qualities, manual dexterity, clear enunciation, alertness of mind, an accurate memory and last but not least, a placid temperament. The period of training depends largely upon the aptitude of the individual; the majority are able to do some effective work on live traffic in two or three months, but it usually takes more than a year before they are equal to handling a normal load. As a check upon operating efficiency, records of a large number of calls are taken daily with a stop watch in London and the large towns from a central observation point and independently of the local Exchanges. Although these tests are only a small sample of the total number of calls, the monthly records show a degree of uniformity over a long period of time which justifies the sample being regarded as representative and as affording a reliable index of the

frequency of the operator's mistakes, of the time occupied in the different operations and of the general quality of the service.

During the war the demand for female labour diverted numbers of telephonists to munitions and other occupations which seemed more attractive as being more directly connected with war work, and owing to the high proportion of new recruits the efficiency of the service rapidly declined. When the post-war boom arrived, the standard of operating was admittedly low and it took several years' sustained effort to restore it to the pre-war level. The records show that 83 per cent. of calls are now effective at the first attempt as compared with 75 per cent. in 1920, and the answering time, i.e. the elapsed time between taking up the receiver and the telephonist's answer, now averages 5.6 seconds.

Before the war at the rates then in force the telephones showed a small surplus after meeting the charges for interest and depreciation of plant. In 1915-16 a few minor increases were made, but with the abnormal rise in the cost of labour and materials during the next few years it became evident that much higher charges would be necessary if the service was to be placed on a paying footing. At the same time the Post Office was anxious to extinguish a number of tariff anomalies which were a legacy from the days of competition with the National Company, and, above all, to abolish the flat rate system of charge.

The flat rate, i.e. a fixed annual payment independent of the number of calls, was a relic of the

early days of telephony when subscribers and calls were few and the aim of the telephone administration was to obtain an assured income from each new installation, irrespective of the use made of it. As the service grew, the defects of the flat rate became more and more apparent; it failed to provide an elastic revenue which would keep pace with the growth of the service and with the cost of maintaining it; it was inequitable as between the small user and the large because it entailed overcharging the former to compensate for undercharging the latter; it checked development which mainly depends upon attracting the small user, and it encouraged the overloading of lines and thereby increased the number of engaged calls.

In 1920 there were about 120,000 flat rate subscribers in Great Britain who were paying in the aggregate some £1,200,000 per annum less than the cost of providing their service. The flat rate has been condemned by almost every telephone administration in the world, and the results of the past five years have abundantly confirmed the wisdom of abolishing it.

The tariff revision of 1921 was founded on the principle that each telephone user should contribute as nearly as possible in proportion to the cost of the service which he requires. The system which gave the closest approximation to this ideal was found to be the "message rate," i.e. a fixed annual charge for the installation together with a uniform fee for each effective local call, and this was applied throughout the country. The call fee was originally fixed at 1½d. and the annual rentals, trunk charges and

subsidiary rates were of necessity substantially increased.

The new tariff, as was expected, excited vigorous opposition, mainly organised by the large users who lost the preferential terms which they had previously enjoyed; but the new rates were shown to be fair as between the large user and the small, and to represent an average increase of no more than 80 per cent. over the pre-war charges—a smaller rise than had been found necessary in most other public utility services. After examination by a Parliamentary Committee, they were successfully brought into operation.

A pledge was given that as soon as a fall in wages and prices produced a material surplus on the telephone account, the public should get the benefit of it by tariff concessions. This pledge has been abundantly fulfilled. An all round reduction of 10s. in the annual rental has been made and in order to attract private residents, a further reduction of 30s., making £2 in all, has been conceded to residence lines; the call fee has come down in successive stages to 1¼d., and then to 1d., and the trunk charges and most of the subsidiary rates have been reduced. These concessions represent in the aggregate a sacrifice of revenue of over £3,000,000 a year, of which the telephone user reaps the benefit.

The question is often asked whether the telephone will become cheaper as the service expands. Administrative, accounting and other overhead charges do not increase in the same ratio as the number of telephones, and standardisation and mass production tend to bring down the costs of particular items of

apparatus. But the economies under these heads are neutralised by the increased complexity and cost of the Exchange plant and of the operating arrangements required to give intercommunication between large numbers of subscribers. The equipment of a small Exchange, which can be worked by one or two operators, is relatively simple and cheap. But at a large Exchange, and, in particular, where direct communication with a number of other Exchanges is required, a quantity of additional equipment is necessary. Thus, a manual Exchange for 200 subscribers costs under £4 per line, while for 5,000 subscribers the cost is £12, and for 10,000 £14 per line; similarly, an automatic Exchange works out at about £12 per line for 200 subscribers, £21 per line for 5,000, and £30 per line for 10,000 subscribers. Again, in a large city the mileage of junction wires required to give intercommunication between its various Exchanges expands in an increasing ratio as the number of Exchanges grows. London, for example, with 300,000 subscribers' lines requires nearly 300,000 miles of junction circuits while Manchester with 35,000 lines needs only 15,000 miles.

The experience of all telephone administrations is that the cost tends to grow rather than to diminish as the system develops. The subscriber gets the advantage, not in the reduction of his charges, but in the greater number of persons with whom he can communicate.

Differences in the system of charge, in the graduation of the scale of fees, in the area covered by the unit call and other factors, make any general

comparison between telephone charges in Great Britain and foreign countries difficult and often misleading. For an annual user of 1,000 calls the charge in New York and London would be approximately level at about £12, while in Berlin the cost would be £7; for 5,000 calls the charge in Berlin would be £26, in London about £28 and in New York £52. The New York tariff was raised in 1924 by the addition of a surcharge of 10 per cent., and authority has been obtained for a further increase, which will take effect as soon as it has been passed by the Public Service Commission—a significant confirmation of the doctrine that expansion of the service does not in itself make for a reduction of rates.

The requisites of a good trunk service—and a good service means a growing traffic—are firstly a standard of transmission which makes conversation not merely intelligible but easy, and, secondly, a sufficiency of lines to ensure calls maturing, even during the busy hours of the day, within fifteen to thirty minutes after they are booked. Whilst these ideals are still some way from complete realisation, the last few years have seen conspicuous progress. In fact, the trunk system has been revolutionised. Since the telephone repeater and the loaded cable made underground transmission over long distances practicable, the Post Office has been constructing a network of underground cables, which now carry nearly all the important circuits. The first cable was successfully completed in 1916 on the London-Birmingham-Liverpool route. The framework of the post-war scheme comprises four main cables,

London to Glasgow via Leeds, Newcastle and Edinburgh; London to Manchester and Liverpool; London to South Wales via Reading and Bristol; and London to Portsmouth and Southampton. There are other important routes to the Eastern Counties, to Brighton and to the terminals of the Anglo-Continental cables on the South Coast, and a large number of subsidiary cables have been laid which give direct cross-country connections between the large provincial towns and on any routes yielding an appreciable volume of traffic. In the last six years the trunk mileage in use has increased by over 70 per cent. and now reaches over 800,000 miles, of which considerably over half is underground.

The underground cable not only gives a better quality of speech and a more stable service at a lower capital cost, but it enables an almost indefinite number of channels of communication to be provided where necessary. If the current amount of traffic, apart from the development of the future, had to be carried on overhead wires, the country would be a forest of poles. Before the war the London-Manchester trunks consisted of sixteen overhead circuits, each containing from 600 to 800 pounds of copper to the mile. The new cable gives 156 circuits with only 80 pounds of copper to the circuit mile.

In the London toll area and on some of the short distance provincial routes a "no delay" service has been introduced, i.e. the caller, instead of having to be recalled when a line is available, is normally connected without replacing his receiver. The convenience of the system is obvious and, although it

requires a lavish expenditure on underground cables, the phenomenal growth of the London toll traffic shows that it is money well spent.

The cost of the trunk service, and indeed of telephones generally, could be materially reduced if means could be found to improve the load factor and to spread the traffic more evenly over the day. At present 37 per cent. of trunk calls are concentrated between 10 a.m. and 1 p.m. and 31 per cent. between 2 p.m. and 5 p.m., while the remaining hours carry only 32 per cent. of the traffic. As sufficient plant has to be laid down to carry the peak-load without intolerable delay, it follows that a number of lines are only in use for some three hours out of the twenty-four, and for some eighteen hours per day a large part of the plant is idle. A few years ago the Post Office attempted to cut down the morning peak by offering a reduction of about one-fourth upon the charge for calls between 2 p.m. and 7 p.m., night calls passing at one-half the full rate, but the effect was surprisingly small and even over large distances where the reduction amounts to an appreciable sum for each call, the diversion of traffic from the morning to the afternoon has been relatively insignificant. The inference must be that the bulk of the trunk traffic consists of commercial calls which cannot be deferred or in regard to which cost is a secondary consideration. The trunk traffic as a whole has responded remarkably to the improvements in the service and it yields a satisfactory return upon the capital expended. About a hundred million calls pass over the wires per annum as compared with thirty-eight million in 1914, and

each year shows an increase in the neighbourhood of 10 per cent.

Another branch of telephone business which has made great strides in the last few years is the Anglo-Continental service. The London-Paris telephone was opened in 1890, but until the advent of the telephone repeater and the thermionic valve satisfactory conversation was practically restricted to the nearer Continental towns. From a technical point of view there is now virtually no limit to the terrestrial distances over which easily intelligible speech can be carried by these means. This does not include long-distance submarine cables over which telephonic speech is not yet practicable. The practical obstacles to the expansion of the long-distance service arises more from the difficulty of securing co-operation and uniformity of plant and method between a number of different countries and, in particular, from the not unnatural reluctance of Continental administrations to reserve sufficient circuits for transit traffic when they have less than sufficient to meet their own internal requirements.

A Standing Committee, known as the International Consultative Committee, and comprising representatives of most of the European telephone administrations, was set up some three years ago and sits at regular intervals in Paris. The British Post Office is represented by the Engineer-in-Chief and other delegates. The function of the Committee, which is purely advisory, is to develop international telephony in Europe, to standardise plant and operating methods and to make a general survey of the new telephone circuits needed to carry

the growing volume of international traffic. The Committee has no executive power to enforce its conclusions or to trespass on the independence of each administration, but it has succeeded in obtaining a large measure of agreement on fundamental issues and it has awakened an interest in international telephony which is just beginning to bear fruit.

As far as Great Britain is concerned, the cross-Channel telephone communications have been more than doubled in the last three years. A new type of submarine cable, paper-covered with lead sheathing, has been evolved, which gives up to twenty-one channels of communication as compared with three or four channels provided by the older telephone cables. New cables of this type have been laid to France, Belgium and Holland, and are connected by direct underground cables with London on the one side and the Continental capitals on the other. A service with Germany via Holland was opened in the autumn of 1926, a reliable service with Switzerland via Paris will be started in the immediate future and extensions to Central and Northern Europe are under discussion. Improvements in the speech transmission and the speed of service have already been reflected in an encouraging rise in the traffic. The calls between Great Britain and the Continent now average nearly 100,000 per month; at present over 90 per cent. of the calls at this end terminate in London and a still greater expansion may be looked for when it is generally realised that equally satisfactory communication is obtainable with provincial towns. Experience has shown that the Anglo-Continental

traffic can bear the charges, relatively high though they may appear to be, and that there is a field for development which has barely been touched. The traffic has hitherto been strangled, especially on the Paris route, by the insufficiency and unreliability of the Continental lines: now that ample lines of the highest quality are available, the telephone will become a more general means of communication not only to the seaboard countries but to central Europe and even to more distant parts.

The telephoning of rural areas has always been a perplexing problem, and an ideal solution has yet to be found. It is abundantly clear that a demand exists at a price, but the price which the rural resident is prepared to pay is a great deal below the cost of providing the service. The cost of installing and maintaining a small rural Exchange is inevitably high in relation to the number of subscribers. The subscribers are usually scattered over a wide area and the cost of each individual line is proportionately heavy; a junction line, generally more than five and sometimes over ten miles long, has to be built to give an outlet to some neighbouring Exchange and thence to the general telephone system; and the charges for operating and accommodation are practically the same for a twenty-line as for a 200-line Exchange, while the revenue derived from the former is very much less.

Until a few years ago, the Post Office assessed a special rental for each small Exchange so calculated as to make it self-supporting after crediting the revenue it was expected to yield. On the principle that each subscriber should bear the cost of the

service he requires, this basis was unexceptionable, but the rentals usually proved prohibitive, many of the prospective subscribers cried off, and schemes which at the outset seemed promising often fell through. An attempt was made to meet the demand by quoting very low rates for rural party lines, which are extensively used in Canada and the United States. But in England secrecy is almost an obsession, and the party line has never been popular and has made relatively little progress.

In 1922 the Post Office decided to make a serious effort to develop the rural areas; farmers and rural residents obviously would not, and probably could not, pay rentals sufficient to cover costs, but it was felt that the telephone service had reached a stage when it could afford to carry an unremunerative fringe, and that if new Exchanges were opened, even with very modest support, they would gradually attract other subscribers in sufficient numbers to reduce, and perhaps eventually to extinguish, the initial loss. The Post Office accordingly offered to establish a new Exchange, where a minimum of eight subscribers could be obtained, at an annual rental of £8 per head for an installation within a mile (now a mile and a half) of the Exchange, extra mileage charges on the usual scale being payable for longer distances.

As was expected, these terms proved attractive and about 1,000 Exchanges with 10,000 subscribers have been opened in the last four years. New schemes are still maturing at the rate of 150 per annum and it will not be long before the more accessible districts at any rate are completely

covered. The average loss upon each Exchange works out at between £50 and £60 per annum, equivalent to an average subsidy of about £4 for each subscriber. It is satisfactory to find that, as was anticipated, each Exchange tends to attract additional support as time goes on and most of the smallest Exchanges which started with the minimum of eight subscribers, have now nine, ten or eleven subscribers.

The loss on rural Exchanges falls ultimately upon the urban subscriber by impinging on the surplus which might otherwise be available for the reduction of charges. So long as the loss remains in the neighbourhood of £50,000 or £60,000 a year on a total telephone revenue of over £17,000,000, the urban subscriber has not much to complain of, but successive Postmasters-General have emphasised the importance of keeping the unremunerative fringe under strict control and have consistently refused any further concessions either in the rates charged or in the minimum number of subscribers.

One of the most effective means of popularising the telephone is the public call-office. In the last few years large numbers have been installed in shops, railway stations and post offices, and with the consent of the local authorities concerned over 2,200 telephone kiosks, accessible by night as well as by day, have been erected in public thoroughfares. In the past the use of many call-offices, where no attendant was in charge, was limited in practice to local calls, as few people kept the pocketful of pennies required to pay for a trunk call. But an improved coin box has now been adopted which accepts shillings and sixpences as well as pence and by

an ingenious mechanism enables the operator at the Exchange to check the money inserted.

Compared with Northern America, and even with the Scandinavian countries, telephonic development in Great Britain at present makes a poor show. In the United States there are fifteen telephones per hundred of the population, in Canada thirteen, in Denmark nine, in Sweden and Norway about seven, and in Great Britain just over three. But in the last few years the service has nevertheless made remarkable strides. When the Post Office took over the National Telephone Company's system on January 1st, 1912, there were 700,000 telephones working; by January 1st, 1922, the number had risen to approximately 1,000,000 and on January 1st, 1927, it stood at close on 1,500,000. There are three million conversations every day or over one thousand million in a year.

In America the development of the telephone, like the development of the motor-car, has been remarkable. It is not easy to understand why, for any given number of persons, there should be ten times as many motors and five times as many telephones in the United States as there are in Great Britain. The principal causes are probably much the same. There are differences in temperaments and habits—by no means negligible factors—and secondly, owing to the higher wage level prevailing, the annual cost of a telephone in the United States, though intrinsically rather greater than in England, bears a much smaller ratio to the average wage earner's income. In consequence, the telephone has secured a firm footing

among the working classes in America, while in this country residential lines are practically confined to the higher paid strata of the population. But recently there have been signs of a change. The number of residence lines is growing rapidly and so is the demand for, and the use of, public call-offices. The value of the telephone, both as a labour saving machine and as a social and domestic convenience, is becoming more widely appreciated. Unless there is a radical change in the wage level of the social strata yet to be attracted or in the cost of telephone service, it is unlikely that we shall reach the American standard of development, but the Post Office looks forward to a steadily rising demand, and it is clear from foreign experience that we have a long way to go before approaching the saturation point.

Chapter IX

BANKING AND REMITTANCE BUSINESS

The Post Office Savings Bank.

SAVINGS BANKS were in existence in Great Britain before the end of the eighteenth century. In 1807 a proposal to establish a national Savings Bank through the machinery of the Post Office was formulated in a private member's Bill, which was introduced in the House of Commons but made no further progress; and it was not until 1861 that the scheme materialised with the active support of Mr. Gladstone, who was then Chancellor of the Exchequer. The Act, which formed the legal foundation of the Post Office Savings Bank and pledged the security of the Government for the due repayment of deposits, was passed in May of that year and, in September, 301 post offices were opened to Savings Bank business. The system then established has stood the test of time; numerous reforms have been introduced in the direction of providing extended facilities for the convenience of the bank's customers, but in its general lines the original scheme remains unchanged.

The accounting is centralised in London, money being remitted to and from headquarters as required. A depositor on opening an account is supplied with a Savings Bank book, in which each transaction is

entered at the time it takes place, and deposits and withdrawals can be made at any post office at which Savings Bank business is transacted. Not only cash, but money orders, postal orders, cheques and dividend warrants are accepted as deposits. The ordinary method of withdrawal is by posting a notice to the central Savings Bank specifying the amount and the office at which payment is desired ; a warrant payable at the office selected is then forwarded to the depositor. In 1893, to provide for urgent requirements, withdrawal by telegraph was introduced and since 1905 withdrawal of sums not exceeding £1 on demand has been allowed. In 1926 out of a total of 10,300,000 withdrawals 74,000 were effected by telegraph and 4,800,000 on demand. Interest at $2\frac{1}{2}$ per cent. is paid on complete pounds for complete months.

In order to confine the use of the Bank to small savings, for which it was originally established, deposits by individuals were restricted by the Act of 1861 to £30 in any one year and £150 in all. These limits were subsequently extended to £50 and £200 and in 1915 were entirely removed. To prevent the temporary deposit of large sums during periods of cheap money, an annual limit of £500 was reimposed in 1923, but is not applied to deposits by friendly societies, charitable bodies, the Public Trustee or to certain other quasi-public accounts.

Moneys received as deposits, less payments in respect of withdrawals, are handed over to the National Debt Commissioners for investment on behalf of the Post Office Savings Bank Fund. Conversely, when withdrawals exceed deposits, the

Commissioners are requisitioned for funds to meet them. A statement showing the liability of the State to depositors and the securities held by the National Debt Commissioners against that liability is presented to Parliament annually and published. The interest on the investments held by the National Debt Commissioners is credited to the Savings Bank Fund, and the interest paid to depositors together with the expenses of management is charged against it. The balance represents the surplus for the year, of which 20 per cent. is at present, under direction of the Treasury, retained in the fund and invested as a provision against the depreciation of securities and the residue is paid into the Exchequer.

The experience of the Savings Bank at the outbreak of the Great War has a special interest as reflecting the growth of national confidence. The week in which war was declared yielded 200,000 notices of withdrawal for £3,200,000 as compared with 80,000 notices for £650,000 in the corresponding week of 1913. Within a few days warrants for £500,000 were returned for cancellation and in many instances when warrants were cashed the money was redeposited before it left the Post Office. By the third week of war withdrawals were below normal, and in the last quarter of 1914 deposits exceeded withdrawals by over £500,000.

At the time of the Armistice the Cabinet decided that the war gratuities payable on demobilisation should take the form of credits in the Post Office Savings Bank. The work thrown on the bank was enormous, not only in opening the accounts and

issuing deposit books at the requisite rate, but in dealing promptly with the flood of withdrawal notices which began to pour in. About 3,500,000 accounts were opened with £56,000,000 to their credit. As was anticipated, a large proportion of the gratuities were quickly realised, but a substantial residue stuck and the scheme was well worth the burden of work which it entailed. There are probably many thousands of ex-service men who have to thank the Savings Bank for a nest-egg which would have been squandered in the first wild week if the gratuities had been paid in cash.

The history of the Savings Bank during the sixty-four years of its existence has been one of practically uninterrupted expansion. By the end of its first year (1862) it had attracted 170,000 depositors with balances of £1,700,000 to their credit; its customers now number over twelve millions, or about one in four of the population, with balances of £283,000,000. The bank opened at 301 post offices; to-day Savings Bank business is transacted in over 14,000 offices, covering every town and nearly every village in Great Britain. The remarkable expansion during and since the war is a striking testimony to the popularity of the bank; during the last ten years, in spite of the competition of Government loans, National Savings Certificates and other securities offering a much higher rate of interest, the clientele of the Savings Bank has increased by three millions and its balances by nearly £100,000,000.

From the financial point of view the Savings Bank has been equally successful. The deficits, which fall upon the Exchequer, have aggregated less

than £900,000 since the institution was established, and the bulk of them occurred in the years 1903 to 1910, following the reduction to $2\frac{1}{2}$ per cent. in the rate of interest on Consols under the Goschen conversion scheme. On the other hand, the surpluses have amounted to £24,500,000, leaving a net profit of about £23,500,000. These results are largely attributable to the cost of management being low in relation to the aggregate value of the deposits. If the Savings Bank were to be converted into a current account bank, the expenses would rise and the financial picture would be less attractive.

The headquarters of the Savings Bank is in a building in West Kensington erected for its use in 1903. The Savings Bank was one of the first Government Departments to employ women on clerical work and the female staff, which was introduced experimentally in 1875, now numbers nearly 2,800 out of a total staff of 4,100 and is responsible for the whole of the ledger keeping and the issue of repayment warrants.

The ebb and flow of work in the Savings Bank is an index of the habits and even of the health of the population. On Saturdays and Mondays deposits are nearly double the average of other days; the opening week of the year invariably shows a spurt, due to Christmas presents aided perhaps by New Year resolutions. Heavy withdrawals by post and by telegraph betoken the approach of a Bank Holiday, and a severe winter means a busy spring in the Death Claims branch.

The popularity of the bank is attributable to many factors but there are two which unquestionably

predominate, namely the convenience of its procedure and the security which it offers. Its success shows that a large section of the population are content with a moderate rate of interest provided they can secure a guarantee against capital depreciation and can operate on their accounts with the minimum of troublesome formality and delay.

Investments in Government Stocks

The Savings Bank was authorised by the Savings Bank Act of 1880 to undertake the purchase and sale of Government Stock on behalf of depositors through the National Debt Commissioners at a small rate of commission. Up to 1914 the business was relatively small, the holdings then amounting to 183,000 of a nominal value of £26,000,000; among Savings Bank depositors Government Stock was then unpopular; by those who had bought Consols through the bank at prices well above par and had realised when they had dropped to the eighties, the bank was regarded as at best a gambling institution and at the worst a form of legalised robbery. In 1915 the growing demands of war finance led the Government to invite the co-operation of the small investor, and for the $4\frac{1}{2}$ per cent. War Loan, issued in June, 1915, a separate Post Office Register administered by the Savings Bank was formed, stock being issued in multiples of £5. The same policy was followed with conspicuous success as regards subsequent Government issues, a Post Office prospectus being issued concurrently with the Bank of England prospectus and offering the same terms. Divi-

dends are either credited to a Savings Bank account, or paid in cash or through a bank, as the holder elects, and facilities are given for buying and selling Government stock through the Savings Bank within a limit of £1,000 per transaction and for transfers between the Post Office and the Bank of England Register.

The appeal to the small investor to play his part in financing the war has had a striking effect upon the distribution of the National Debt. In 1914 the total holdings of Government stock were in the neighbourhood of 400,000. While the bulk of the debt is still held at the Bank of England, in the books of the Savings Bank there are now some 2,500,000 accounts of a nominal value of nearly £190,000,000, besides Savings Certificates and Savings Bank deposits. That a large section of the population embracing all classes should have a stake in the maintenance of British credit is a distinctly healthy symptom, which may not be without political consequences.

National Savings Certificates

National Savings Certificates, originally known as War Savings Certificates, are the offspring of a committee appointed in 1916 upon "War Loans for small investors." The Government was particularly anxious at the time to stimulate thrift among the working classes, partly with the object of attracting even the smallest savings to assist in financing the war and partly to reduce the national expenditure upon commodities and thereby to

bring down, or at least to check, the rise in prices. For this purpose the prime necessity was to find a simple and easily intelligible scheme, which could be operated at a low administrative cost, for saving small amounts by instalments.

The Savings Certificate is purchasable over the Post Office counter and embodies what was then the novel principle of a graduated automatic increase in value over a period of years with no payment of interest apart from the repayment of principal; in other words the interest accumulates and is paid with the principal on maturity or on any earlier date at which the certificate is presented for encashment. The increase in value, which is the equivalent of interest, is free of income-tax. In order to keep the loss of tax-revenue within reasonable limits, certificates were, under the original scheme, to be confined to holders whose incomes did not exceed £300 per annum, but this proved unworkable and as an alternative the maximum holding of any individual was limited to 500 certificates. The life of a certificate was originally five years but was later increased to ten years; the period is automatically extended by the purchase of fresh certificates, all certificates of the same issue taking the maturity of the last purchase.

A certificate of the first issue cost 15s. 6d., its value increasing to 20s. in five years and 26s. in ten years, giving a yield of 5 per cent. compound interest tax-free. A second issue was started in April, 1922, when the price was raised to 16s. to correspond with the lower price of money then prevailing, the value at maturity remaining unchanged. In October,

1923, a third issue was made, the price remaining at 16s., but the value rising to 20s. in six years instead of five and to 24s. in ten years.

From their first appearance, Savings Certificates have been energetically pushed by the National Savings Committee and the local Savings Associations and have met with astonishing success. The issues up to March 31st, 1926, a period of ten years, represented a nominal value of £765,890,603 and an investment of £598,322,233. Repayments of principal (excluding interest) during the same period came to £222,746,843 or about 37 per cent. of the amount invested. The accrued interest on certificates remaining unpaid on March 31st, 1926, is estimated at about £100,000,000. The holders of Savings Certificates are believed to number between seven and eight millions.

Some years ago it was arranged that half the proceeds of the gross sales of certificates in the area of any local authority should be available for loans to that authority for housing or for any other purpose for which the Public Works Loan Commissioners have power to lend, and loans amounting to some £12,000,000 have been so granted, including £6,500,000 for housing.

The administration of Savings Certificates is in the hands of the Money Order Department. The system of registration, devised for an issue which was expected to be of limited duration, and at a time when clerical labour was almost unobtainable, consists in filing the counterparts of certificates, as they are issued, in proper order, so that when repayment is claimed, the counterpart can be easily

associated with the original certificate. The system is simple and efficient, but it calls for extreme accuracy in the disposal of the records and extensive accommodation, the documents now in store numbering over 300,000,000. The work of registration and repayment and the correspondence arising from the scheme employs a staff of 1,200, mainly women.

Money Orders

The money order system dates from 1791 and owes its origin to the enterprise of a number of Post Office clerks who started the service as a private speculation and carried it on by themselves and their successors for close on fifty years. The Postmasters-General had been anxious to introduce some form of official remittance service in the hope of checking the thefts from the post of letters containing money, but they were advised that, as the law stood, it would be *ultra vires*. This did not prevent them from sanctioning and probably instigating the scheme of their subordinates, and for some years the money order correspondence was allowed to pass free under the Post Office frank, a proceeding which, it is not surprising to find, eventually got the Department into trouble with the House of Commons. Orders were issued up to a maximum of five guineas and a commission of eightpence in the pound was charged, of which the issuing postmaster and the paying postmaster each received threepence and the proprietors retained the remaining twopence. The service was worked through the departmental machinery,

and it is a curious commentary on public administration a hundred years ago that what was to all intents and purposes a Post Office service should have been allowed to continue so long as a private venture with official cognisance and encouragement.

By 1838 criticism forced the Post Office rather reluctantly to take over and regularise the service and the two surviving proprietors were granted pensions of £500 and £400 a year as compensation for being expropriated. The maximum value of a single order was gradually raised to £40 and the scale of commission was as gradually reduced. The money order is necessarily an expensive form of remittance, largely owing to the "Advice," which is posted from the office of issue to the office of payment and upon which the security of the system rests, but in spite of the competition of postal orders and to some extent of currency notes, it is still largely used, nearly fourteen million money orders being issued annually.

During the Crimean War, official means of sending money home were provided for the soldiers, but not for the civilian element attached to the Army. For some months Florence Nightingale filled the gap, until it was decided to issue money orders through the Army Post Offices at Balaklava, Sebastopol and a few other centres. From this modest beginning sprang the foreign money order service, which was first extended to Canada, then to other British possessions and finally to foreign countries. The Post Office now exchanges money orders with most foreign postal administrations.

For the benefit of those who require urgent

remittances money orders can be authorised by telegraph, the remitter paying the cost of the official telegram of advice and a small supplementary fee. Telegraphic money orders are available in the inland service and to most of the important Dominions, Colonies and foreign countries.

Postal Orders

Postal orders owed their inception to the need for a medium for small remittances, which would be cheaper to the Post Office and at the same time less troublesome to the public than the money order. It was accordingly decided to issue postal orders, originally known as postal notes, of certain fixed denominations (at the outset ten in number), which could be cashed at any post office when receipted by the payee. The "Advice," which is the most expensive element in the money order system, was dispensed with. It was recognised that the postal order would not possess the same security in case of loss or theft as the money order, but if the remitter desires additional protection, he can limit payment to a particular post office or cross the order for payment through a banker. Parliamentary authority was obtained and postal orders were placed on sale on January 1st, 1881. At a later date the scheme was extended to include most of the Dominions and Colonies, and British postal orders are now available for remittances to and from Great Britain, and between one part of the Empire and another, as well as for internal use.

The use of postal orders reached its maximum in

1913-14 when 159,242,000 orders of a value of £59,206,000 were issued. The introduction of Treasury notes at the outbreak of war, combined with an increase in the rate of poundage, caused a heavy drop, but the upward trend has now been resumed and the issues in 1925-26 amounted to 130,000,000 of a value of £45,000,000. The most popular order is the 5s., followed by the 2s. 6d., 2s. and £1.

One of the objections originally urged against the postal order scheme was that it introduced what was potentially a paper currency. The objection was overruled on the ground that the commission charged for a postal order and its limited validity would prevent it from being generally used for currency purposes, and experience has shown that there was no ground for alarm. It is a curious sequel that at the outbreak of war when small currency was urgently required, postal orders, which were then issued free of poundage, were temporarily made legal tender.

Postal Drafts

In order to provide a cheap and convenient means of paying benefits of varying amounts under the National Health Insurance Act to persons who might find difficulty in cashing a cheque, and at the same time to secure for the paying society a receipt from the payee, a new form of remittance, known as the postal draft, was devised; and it has subsequently been extended to large numbers of small payments made by Government Departments

and Dominion Governments. Postal drafts are not negotiable and are practically cheques drawn on the Postmaster-General and payable against the receipt of the payee either at any post office or at a specified office. The drafts are supplied in books to the issuing authority, which refunds to the Postmaster-General the value of the drafts together with a small additional charge to cover the cost of payment and accounting. When paid they are returned to the issuing authority and form a complete voucher for accounting purposes.

About four million drafts of a value of £9,000,000 are cashed by the Post Office annually. They are considerably cheaper to administer than money orders, and it is possible that when an opportunity occurs statutory powers may be sought to enable them to be extended to other bodies which have occasion to make numerous small payments.

Chapter X

MISCELLANEOUS SERVICES

BEGINNING as an organisation devised solely for the conveyance and distribution of letters, the Post Office has attracted a vast mass of miscellaneous functions. Some of these are the natural offshoots of its principal services, but others have not the remotest connection with communications and have fallen to the Post Office as the cheapest and most convenient agent for some other Department of State.

Thirty or forty years ago the Treasury and the Post Office itself looked askance at any extension of its operations, partly on the general principle of *laissez-faire* and partly from fear lest the cultivation of by-products might divert energy from its primary duties. But when the Government embarked upon social services such as old age pensions and the various forms of State insurance, the local post office suggested itself as the obvious and most accessible agency for the receipt and payment of small sums, whether as contributions or benefits, and for similar operations. These duties for the most part only affect the counter staff and the accounting departments, but the Post Office has at times been rather concerned at the growing variety of the extraneous work imposed upon its local offices.

The primary Post Office services have themselves evolved a large variety of minor facilities. The department's policy has been not to embark upon competition with established agencies which cater for the requirements of the public efficiently and cheaply, but to endeavour to fill gaps where the existing facilities, if any, are cumbersome or expensive. The Post Office has been at considerable pains to provide for communications which are of special urgency or for which the ordinary services for some reason or other are not available. By combining in various ways the posts, telegraphs and telephones it is possible to give facilities which no single service could offer.

It is inevitable that the auxiliary services should not be widely known. Their number and the fact that each of them appeals to a very limited clientele is a bar to extensive advertising. The Post Office Guide, where the details are given, is not an inviting form of literature and does not tempt people to delve in it for information which they may never have occasion to use. The possibility of sending letters by railway and of dictating them by telephone is fairly well known; but few people are aware that for a small subscription the Post Office will transmit Greenwich Mean Time daily to their houses by electric signal or that they can obtain weather forecasts by telegraph or telephone from the Meteorological Office.

The following summary, which is by no means exhaustive, may give some idea of the scope and variety of the subsidiary services which the Post Office administers.

Insurance and Annuity Business

The Post Office was first authorised to grant life insurances and annuities on a limited scale by the Government Annuities Act, 1864. Twenty years later the scheme was remodelled and linked up with the Savings Bank. The business done has never been large and, in spite of spasmodic but extensive efforts to stimulate it by leaflets and other propaganda, for a good many years past it has been declining. When the Government scheme was launched, some of the friendly societies and insurance companies were in a precarious financial position, and it was thought desirable to offer facilities to the working classes for insuring their lives for small amounts with the advantage of Government security. But the conditions of to-day are entirely different. No one would challenge the stability of the large industrial assurance companies which at present completely cover the field, and it is clear that a Government scheme could never be a popular success or compete effectively with the companies, unless intensive canvassing and the personal collection of premiums were undertaken. The Government have never been willing to set up the large and expensive organisation which a policy of active competition would entail, and, if they did, it is improbable that with the additional costs of management and the more limited range of investment they could offer materially better terms than their competitors.

Registration

Registration in its present form was introduced almost simultaneously with penny postage. Originally the object was to obtain by payment of an extra fee some additional measure of security for delivery, and it was not until later that registration became also a system of insurance and was extended to parcels as well as letters. The minimum fee of threepence carries compensation in the event of loss or damage up to £5 and the scale is graduated up to a maximum insurance of £400 at a fee of 1s. 11d.

In the international service the conditions are different. Registration only gives a claim to compensation in case of complete loss, and then only up to a limit of £2. To cover the risk of loss or damage of contents, or to secure a higher compensation, the insurance service which is available between most of the large States must be used.

Registered letters have increased enormously since pre-war days, largely owing to the use of currency notes for remittance purposes, and they now number nearly sixty millions a year. The principal difficulty which the Post Office experiences is to induce the public to comply with the regulations as to packing, method of posting, etc., which are necessary as a protection against fraudulent claims for compensation.

Cash on Delivery

Cash on delivery has been a feature of the postal service of nearly every European country for many

years and is widely used on the Continent and in some of the British Dominions. It was proposed to establish a service in Great Britain as long ago as 1904, but retail interests took panic at the prospect of active competition with the big stores and mail order houses, and the general scheme was eventually withdrawn. But services were gradually opened with a large number of the Crown Colonies, and after the war the system was extended to France, Belgium, Holland, the Scandinavian countries and a number of other States. Within those limits it worked successfully and expanded rapidly. Nearly 300,000 C.O.D. parcels of a value of £750,000 are dispatched abroad each year and some 10,000 are received from abroad. The foreign service may therefore be said to be a modest contribution towards the export trade of the country.

Reports obtained from abroad showed that in almost every country which had adopted it, the cash on delivery service gained year by year in popularity and that the retail trades, which at the outset were nervous and hostile, had in course of time become warm supporters. There was no reason to suppose that the experience in Great Britain would be different, and in 1926 the Government authorised its extension to the inland service.

The working of the system is extremely simple; the sender fills in a form when handing the parcel over the counter and the money is collected from the addressee by the delivering postman or, if it exceeds £5, the addressee is asked to call at the local post office. As soon as the money has been collected, the postmaster issues a crossed order and posts it to

the sender, who should receive payment within two or three days of the parcel being dispatched. The sender pays, in addition to the parcel post charge, a C.O.D. fee upon an *ad valorem* scale beginning at fourpence for a value of 10s. or less and rising to 2s. for the maximum of £40. For parcels of low value the postage charges work out relatively high. But the C.O.D. fee has to cover the additional costs at the counter as well as the cost of collection and remittance, and the limited experience at present available indicates that the scale yields only a fractional margin of profit.

The inland cash on delivery service has now been working for about a year and something over a million parcels have been carried by it. In view of the alternative, and often cheaper, means of remittance available, the traffic is never likely to assume embarrassing proportions, but the figures show that up to the present it has justified its existence.

Express Delivery and Railway Letters

The express delivery service was opened in 1891 and is worked through the telegraph messenger staff. There are a number of different services, the most generally used being the conveyance of a letter or parcel the whole way from the sender to the addressee, or only from the office of destination after transmission by post, in order to secure delivery in advance of the ordinary postman. The express service can also be used to accelerate the delivery of a railway letter or a telephone letter and in some

of the largest towns for special delivery of letters on Sunday, or even for the conduct of a person from one address to another. Letters and parcels to and from a number of foreign countries can also be expressed for special delivery on arrival at the office of destination.

The Postmaster-General has agreements with most of the railway companies under which letters may be handed in at a railway station for conveyance by the next train to the station of destination, either to be called for there or to be posted or sent on by express messenger.

Sale of Stamps

The use of stamps for the prepayment of postage was an integral part of the Rowland Hill reforms of 1840, and their convenience and simplicity has led to their being adopted for many other purposes for which evidence of the payment of a small sum is required. From their early days stamps were utilised for inland revenue duties, and for the smaller duties, such as the cheque and receipt stamp duties, ordinary postage stamps are accepted. Stamps afford the obvious medium for denoting the payment of contributions under the various State insurance schemes launched within the last fifteen years, and special issues are made for health and pension insurance and for unemployment insurance, which are on sale at local post offices. The sales of health and pension insurance stamps come to about £42,000,000 and of unemployment insurance stamps to £27,000,000 per annum. The Post Office also

dispenses income-tax stamps and entertainment duty stamps, but on a much smaller scale.

The collection of these large sums by means of stamps is an extremely simple and economical process, but it has necessarily meant a substantial addition to the turnover of local post offices and to the work of the counter staff and of the Accountant-General's department.

Payment of Pensions

When old age pensions were instituted in 1908, means had to be devised for making weekly payments all over the country at offices conveniently accessible to the pensioners, and the local post office offered the obvious solution. So began a system upon which was founded, with only minor variations, the payment of separation allowances during the war, of war pensions and of widows and orphans pensions under the Act of 1925.

The machinery is simple and inexpensive. The old age pensioner receives from the pension officer a book containing fifty-two orders, similar to postal orders, upon each of which is printed the amount of the weekly pension and the due date on or after which it may be cashed. To establish identity and the fact that he is still alive, the pensioner is required to attend personally with the book of orders, except in case of illness when payment may be made to an authorised agent. The Post Office counter clerk detaches the order for the week, which is receipted by the pensioner, pays the money and stamps the order and the relative counterfoil with

the office date stamp. The order is retained by the Post Office as a voucher for the Post Office claim against the old age pension vote.

Widows and orphans' pensions under the Act of 1925 are paid in the same way and war pensions only differ in that the books of "Allowance forms," as they are called, are kept at the local post office and the claimant has to produce a card of identity.

During the war under this system some £600,000,000 was paid in separation allowances in 700,000,000 separate payments. The annual payments now come to about £31,000,000 for old age pensions, £55,000,000 for war pensions and £6,500,000 for widows and orphans pensions, a sum which of course will rapidly increase.

Licences

Local taxation licences, e.g. dog, gun, game licences, etc., and motor vehicle renewal licences, are obtainable at local post offices. The proceeds of the local taxation licences issued in England and Wales were transferred in 1909 to the County Councils, and the Post Office pays over to each Council the duties collected in its area. The collections in Scotland are paid to the Board of Customs and Excise. The motor vehicle licence duties are ultimately divided between the Exchequer and the Road Fund and the Post Office accounts to the Ministry of Transport. The local taxation licences collected by the Post Office come to about £1,500,000 per annum and the motor vehicle renewal licences to about £2,000,000.

The function of the Post Office is confined to the issue of the licences and the collection and distribution of the revenue ; it is not, of course, responsible either for enforcement or for advising upon questions of liability.

Chapter XI

POST OFFICE ORGANISATION

THE Post Office is in fact, as well as in name, a Revenue Department, and it is a fairly safe assumption that the Chancellor of the Exchequer, to whatever party he may belong, will endeavour to secure that it remains so; on the other hand, its customers urge, with a vigour which usually bears some relation to the Post Office profits at the time, that it should cease to be a medium of taxation and should charge for its services cost price, and frequently something considerably less. Whatever the ultimate issue of this conflict may be, the Post Office will remain one of the largest commercial or public utility undertakings in the country, and while finance is always an important, and in many questions a dominant factor, its principal function is and will continue to be to provide the services which the public require and to conduct them with the maximum of efficiency.

A commonplace criticism is that the Post Office should be, but is not, organised on "business lines." While the broad aims of the Post Office organisation and that of a commercial undertaking are much the same, viz. efficiency combined with economy, the conditions under which they work are widely different. The Postmaster-General has nothing approaching the autocratic powers and undivided

control that a board of directors exercises over the affairs of a company. He is subject to the overriding authority of Parliament and the Cabinet and, on many questions, of the Treasury. His expenditure, in common with that of other departments, is governed by the necessity of balancing the national Budget. Thus it follows that whatever surplus the department itself may show, schemes, which on their merits are remunerative and unexceptionable, may have to be dropped or deferred, if the Exchequer is not at the moment in a position to finance them. The Postmaster-General's buildings are provided by one department and his printing by another, neither of which is under his direction. The departmental regulations and their application must be uniform and consistent, and special terms cannot be given to a valuable customer unless they can be conceded to all. Each question must be decided not merely with regard to its own merits, but by reference to the possible reactions which it may produce elsewhere, and every decision must be taken with the knowledge that it may be dragged into the arena of public discussion. A Government department must be equipped to meet Parliamentary enquiry or criticism, not only upon broad questions of policy, but upon the most trivial detail of local administration. The Postmaster-General may at any time be asked why a telephone has been refused in one village or a pillar box in another, or why in some remote district Mr. A has been promoted in preference to Mr. B, and departmental records must be forthcoming to enable him to sustain or, if necessary, to overrule the decision of his subordinates.

The G.H.Q. of the Post Office is the Secretary's office. Here all matters of policy and questions of more than local application are dealt with, regulations and instructions are framed for the conduct of the various services and the guidance of the executive officers in charge of them, and a general managerial control is maintained over the whole organisation. In recent years the policy of decentralisation has been considerably extended. By an elaborate system of delegation, wide discretionary powers are conferred upon local officers, varying in extent with their status; these powers have to be exercised in conformity with the standards of service and other instructions prescribed by headquarters, and are usually subject to some definite limitations, such as a maximum capital or annual cost, beyond which headquarters' sanction is required. By means of regular periodical returns of the postal, telegraph and telephone traffic and of the staff employed on handling it at each of the more important centres, the Secretary's office keeps a continuous check upon the expenditure and output.

It is a common criticism that Government Departments burden themselves with a far more centralised organisation than would be tolerated by a commercial company. Parliamentary intervention, Treasury control and, in recent years, the right of appeal to headquarters which has been conceded to recognised associations of Post Office servants, all have a centralising tendency, but there is reason to believe that the large railway companies, for instance, which have similar problems to face, do not give their local staffs

as extensive powers as the Post Office have found possible.

A new departure was made some few years ago in the establishment of the Post Office Advisory Council, which is available for consultation by the Postmaster-General, especially upon proposals for the institution of new or the alteration of existing services. The Council at present consists of fifteen members of varied commercial experience who are appointed on the invitation of the Postmaster-General by reason of their individual qualifications and not as representing particular interests. The Postmaster-General presides at the meetings and it is open to any member of the Council to suggest a subject for inclusion in the agenda; the members are kept in touch with the current proceedings of the Department by means of periodical progress reports. The Council renders valuable advice upon many problems of which the members have had practical experience, and is useful in maintaining contact between the administration and the public.

To pass to the detailed organisation of the department, the supreme head of the Post Office is the Postmaster-General, the successor of the "Master of the Posts" of Henry VIII's time. He is a member of the Government of the day, holding office from the Crown by Letters Patent under the Great Seal; in some Ministries, but not all, he is included in the Cabinet. As the Post Office is seldom responsible for controversial legislation, and is not directly concerned in the major items of the Government programme, the Postmaster-General has more time than many Ministers to devote himself to

departmental work. All questions of general policy and many matters of current administration, especially those which are likely to attract public attention, are submitted to and decided by him personally. Since 1909, with a few intervals, an Assistant Postmaster-General has been appointed who, as his designation indicates, assists the Postmaster-General and occupies generally the same position as the Parliamentary Secretary in other departments.

The permanent head of the department and the Postmaster-General's principal adviser is the Secretary to the Post Office. Assisted by the Second Secretary, who acts as his deputy, and the staff of the Secretary's office, he is responsible for the whole organisation of the department and the efficient working of its various services. Next in rank and directly responsible to the Secretary come the Director of Postal Services, who controls the mail services, both inland and foreign, and the Director of Telegraphs and Telephones, who is in charge of the Telegraph, Telephone and Wireless Services. The Secretary's office is divided functionally into seven administrative divisions, each under an Assistant Secretary, working either to the Second Secretary or to one of the Directors, with its appropriate complement of subordinate ranks. These branches deal respectively with (1) mails, inland and foreign, (2) inland telegraphs, (3) overseas telegraphs, including wireless services, (4) telephones, (5) establishments, i.e. the numbers, organisation and pay of the Post Office staff, (6) staff, i.e. personnel and questions such as recruitment, promotion and

discipline in the Post Office service, (7) buildings and supplies.

Apart from, but working in close conjunction with the administrative branches, are the Chief Inspector of Postal Traffic, the Chief Inspector of Telegraph and Telephone Traffic, and the Inspector of Wireless Telegraphy. With the assistance of their staffs they fulfil the dual rôle of a headquarters inspectorate and of expert advisers upon such technical questions as do not come within the province of the engineering department. The Inspector of Wireless Telegraphy is also directly responsible for the working of the coast wireless stations used for communication with ships at sea. Finally, the Secretary's office includes a small detective staff, known as the Investigation Branch and recruited by selection from the Post Office staff, which is engaged upon the investigation of cases of suspected theft, fraud or other offences against the Post Office.

In close touch with the Secretariat are the Solicitor to the Post Office and the Chief Medical Officer. The Solicitor conducts the extensive and varied legal business of the department; he advises upon questions of law arising in any branch of Post Office administration; on doubtful points he obtains counsel's opinion and, in matters of special importance, the advice of the Law Officers of the Crown. The Solicitor briefs counsel and carries through all litigation in which the department is involved and conducts, either directly by his own staff or through local agents, Post Office criminal prosecutions. He is responsible for the examin-

ation of all Parliamentary Bills with a view to securing protection for the Postmaster-General's interests, and for the conveyancing business in connection with the purchase, sale and leasing of Post Office property. The Solicitor's office is staffed by qualified solicitors assisted by a number of non-professional clerks.

The Chief Medical Officer advises the department on all medical and public health questions and controls the Post Office medical service throughout the country. He has the assistance of a number of full time medical officers at headquarters, who also undertake the medical treatment of the Post Office staff in the central district of London.

The remaining headquarters departments comprise three financial services—the Accountant-General's Department, the Savings Bank and the Money Order office—and two technical services—the Engineering Department and the Department of the Controller of Stores.

The Comptroller and Accountant-General is appointed by the Postmaster-General with the concurrence of the Chancellor of the Exchequer. He is responsible for the Post Office accounting system in all its branches and his department receives and checks the daily accounts of the transactions at local post offices. He is the Accounting Officer of the Post Office Vote and Comptroller of the Post Office Revenue; he prepares the Annual Estimates and Appropriation Accounts, and he provides the financial returns and statistics required for publication or for departmental use. The extent of Post Office operations may be gathered from the fact that cash

receipts and payments passing through the Post Office accounts amount to about £1,200,000,000 a year. The Comptroller and Accountant-General is also the financial adviser to the Department; all proposals involving an increase of expenditure or a sacrifice of revenue are referred to his department for financial criticism before they are finally sanctioned, and he is consulted upon any matter, whether of administration or policy, having a financial aspect. His *métier* is to combine the rôle of a vigilant financial critic with a temperate enthusiasm for the Post Office and its manifold operations.

The Savings Bank keeps the accounts of its twelve million depositors, administers the Post Office life insurance and annuity business and manages the Post Office register of war loans, which includes some 2,500,000 separate accounts and entails the distribution of over five million dividends a year.

The Money Order Department takes the postal order and money order services and is responsible for the custody and repayment of national savings certificates.

The Engineering Department, under the control of the Engineer-in-Chief, is responsible for the design, construction and maintenance of the Post Office engineering plant, including telegraphs and telephones, wireless stations, submarine cables and electric light and power installations. The headquarters staff includes specialists in the various branches of Post Office engineering work, such as automatic telephones, telegraph and telephone apparatus and cables, wireless, etc., whose duty it is to keep in touch with new developments which bear

upon the work of the Post Office. Not the least important branch of the engineering department is the research station situated on the outskirts of London which undertakes original experimental research according to an organised programme. The headquarters staff is engaged partly upon general technical questions, the improvement of plant and the preparation of designs and specifications for the various items of Post Office equipment, and partly upon the control and supervision of the engineering organisation throughout the country. For administrative purposes the country is divided into fifteen engineering districts, each in charge of a Superintending Engineer, who is responsible to the Engineer-in-Chief for the maintenance and renewal of the plant, for the work and organisation of the staff within his territory and for the execution of works of construction, either within the limits of powers delegated to him or in more important cases upon detailed schemes approved by headquarters. The engineering district is again sub-divided into a number of sections, under the control of an executive engineer, and this is the smallest administrative unit.

The Controller of Stores is responsible for all Post Office contracts, other than those for manufacture and erection *in situ* (e.g. new telephone exchanges and certain cabling works) which fall to the engineering department, for the receipt, custody and issue of all Post Office Stores and for the management of the two Post Office factories in London and Birmingham which are used for the repair of telegraph and telephone apparatus. The

Controller of Stores therefore combines the offices, which in other departments are often separate, of Director of Contracts, Director of Factories and Controller of Stores. The stores purchases in a year come to about £5,500,000. The general principles upon which the purchases are made are approved annually by the Postmaster-General, and contracts within the scope of these regulations are concluded on the authority of the Controller without superior sanction. The normal procedure is by competitive tender with a preference for British-made goods.

So much for the headquarter departments. To pass to the local establishments, the metropolitan and provincial organisations are fundamentally different. In London the concentration of an immense mass of routine work within a small and indivisible geographical area makes a functional organisation possible and economical, and the three divisions, posts, telegraphs and telephones, into which the Post Office services naturally fall, have their separate organisations, each under its own Controller, who is in direct touch with the Secretariat.

The London Postal Service is responsible for the postal arrangements throughout London, for the telegraph facilities at the local post offices and for the general control of the thousand offices by which London is served. The staff of this department, which numbers about 33,000, is mainly engaged upon the collection, sorting and delivery of London's correspondence; every day it handles about 12½ million letters, postcards, etc., and 250,000 parcels.

It also acts as a distributing agency for correspondence in transit between places in the provinces and particularly in the Home Counties, and it is the principal channel through which the foreign mails, inward and outward, are dispatched to their destinations.

The London Telephone Service shares with the engineering department the responsibility for the efficiency of the telephones in the London area. While the province of the engineers is the provision and maintenance of equipment of all kinds, the Controller of the London Telephone Service is in charge of the organisation and operating at the exchanges, the recruitment, training and supervision of the personnel, the collection of and accounting for the telephone revenue accruing in London, and the operations of the contract and canvassing staff. The London trunk and toll exchanges, which handle a large proportion of the trunk traffic, are in his province and he controls the Anglo-Continental telephone services. It is his duty to keep a close watch upon the growth of the telephone demand and, in consultation with the engineering department, to initiate schemes for new exchanges and other extensions of plant to meet it.

The Central Telegraph Office is the pivot of the British telegraph system. It is not a clearing house, i.e. it is not the general transmitting centre for the whole country, but it is significant of its telegraphic importance and of the position of the metropolis as the political, commercial and financial centre of Great Britain that out of fifty-five million inland telegrams, thirty-three million are handled

at some stage within its walls. With the exception of a few wires worked direct from the Threadneedle Street office for Stock Exchange purposes, the whole of the telegraphic circuits connecting London with the provinces are terminated in the Central Telegraph Office, and the operation of the Anglo-Continental telegraphs, the Imperial cables and the wireless telegraph services conducted by the Post Office with the Dominions and with the continent of Europe, is concentrated there.

In the provinces, unlike London, the administrative boundaries are geographical and not functional. The country is divided into twelve surveyors' districts, and nine of the largest towns—Birmingham, Glasgow, Liverpool, Manchester, Leeds, Bristol, Newcastle, Sheffield and Belfast, with the areas immediately surrounding them, form separate districts each in charge of a postmaster-surveyor. The Secretary to the Post Office in Edinburgh exercises a general control over Post Office business in Scotland, and exceptionally the postmaster-surveyor of Belfast is in charge of the whole of Northern Ireland.

The surveyor, or the postmaster-surveyor, as the case may be, is the Postmaster-General's principal local representative and is responsible for all the Post Office services within his boundary. He is vested with considerable independent powers by delegation from headquarters and reports direct to headquarters on matters upon which superior authority is required. The postmaster-surveyor acts as postmaster of his own town and exercises the powers and duties of a surveyor over

the surrounding area which is included in his district.

Subject to the surveyors are the postmasters of the towns where a head post office is situated, to the number of 490. The postmaster is immediately responsible for his own office and for the inspection and supervision of the sub-offices within his head office area.

For telephone purposes, the country is divided into twenty-eight telephone districts coterminous with the engineering districts or sections with a district manager in charge of each. As the surveyor's representative the district manager is directly responsible for the telephone service in his district, apart from the provision and maintenance of plant which falls to the local engineers. He has at his disposal a traffic, accounting and canvassing staff, and for certain specified purposes he uses the postmasters as his local agents. The division of functions between the district manager, who is in charge of the commercial or operating side, and the engineers, who are responsible for the equipment side, requires close co-operation, for which personal contact is indispensable. It is the duty of the district manager to obtain new orders, to conclude agreements and to ascertain the subscriber's requirements; having done so, he passes the order to the local engineers for the engineering work to be put in hand and the equipment to be installed.

Suggestions are occasionally made that some particular service, it may be telegraphs or telephones or wireless, should be divorced from the Post Office machine and administered by a wholly or partially

distinct organisation. The underlying theory is presumably that a separate organisation would be more efficient or more economical, or both. The advocates of this policy have not, as a rule, had practical experience of the internal working of the department, and probably have little idea of the extent to which the various Post Office services are interwoven or of the additional labour costs which separation would entail. On the engineering side, the telegraphs and telephones are obviously inseparable; the wires are carried on the same poles and in the same underground cables, and a single staff must clearly be responsible for the maintenance and repair of both. On the operating side, the interconnection between the telegraphs and the posts is equally close; in fact, one of the principal arguments advanced for the State acquisition of the telegraphs in 1870 was based on the economies which could be secured by utilising the widespread postal organisation for telegraph purposes. It conveniently happens that the peak pressure on the postal side occurs at hours when the telegraph business is either light or entirely closed down, and the rush of telegraph traffic and counter business coincides with the hours when the postal work is at its minimum. It is therefore possible with a common staff to provide for both services with the minimum of wastage. With two separate establishments an adequate staff could only be provided in most towns for the peak periods at the expense of a heavy deadweight of idle time. It is only in London and the largest head offices that the work is sufficiently heavy and concentrated to admit of specialised staffs.

In so far as the working of the Post Office services, whether at the public counter, in the telegraph instrument room, or in the sorting offices, is carried out by a unified staff, it necessarily follows that the local controlling and supervising officers are also borne on a common class.

The organisation of the point-to-point wireless services is governed by somewhat similar considerations. They are all operated under the supervision of the Controller of the Central Telegraph Office and his assistants, and in close proximity and under the same direction as the cable and inland telegraph services which they feed and by which they are fed.

Under the Post Office system of organisation, as the jurisdiction of the executive authorities in the districts expands, there is a parallel development of expert advisers and specialists attached to headquarters or to the larger metropolitan and provincial centres. And the administrative branches at headquarters, while working in close conjunction with each other, are in themselves functional units and are associated with the specialist staffs; at the head of the organisation is the Secretary, who virtually holds a position equivalent, both in its administrative and executive aspects, to that of a general manager in a large commercial undertaking.

Chapter XII

THE POST OFFICE STAFF

UNTIL a few years ago the Postmaster-General was the largest employer of labour in the country, but since the amalgamation of the railway companies in large groups he has lapsed into second place. The Post Office staff, permanent and temporary, numbers about 224,000, of whom 172,000 are men and 52,000 women. About two-thirds are established and eligible for pensions under the ordinary Civil Service terms embodied in the Superannuation Acts. Of the remainder, the majority are part-time employees, who cannot qualify for pensions but whose employment is none the less practically permanent.

Owing to the scope and variety of Post Office duties, the staff is necessarily divided into a large number of grades with different duties and different scales of pay. Most of the large Post Office classes have an avenue of advancement, generally through a limited competition, to superior grades, as well as opportunities of direct promotion to the supervising posts on their own establishments. The preponderance of routine work makes the proportion of supervising appointments to the rank and file staff relatively small, and promotion in the direct line seldom comes at as early an age as either the department or the staff would desire. The limited

competitions, for which the maximum age limits are generally relatively low, are designed to afford opportunities to capable men and women already in the Post Office service of improving their positions and prospects at an age when they are still able to adapt themselves to new duties. That there is a wealth of talent in the subordinate ranks of the Post Office no one would dispute. To make the fullest use of it, machinery must be devised which will bring officers of outstanding ability to the front in time to give them a chance of rising eventually to the highest ranks of the service. It is a problem which confronts every organisation employing a large personnel, and few problems are more important or more difficult. The system of competitive examinations, especially when applied to adults who have been some years in the Post Office service, is not without its defects, but on the whole it is probably as satisfactory a method of selection as any other criterion which could be devised. The staff as a whole are eager to take advantage of the openings available to them, and the material produced by the limited competitions reaches a high standard. The ladder of promotion is necessarily a narrow one, but it is there for those who are able to climb it, and it is a significant fact that at least a dozen officers, now holding important posts in the Department and earning £1,000 a year or more, began their official careers as boy messengers, telegraph learners or in other positions on the manipulative staff.

For a large proportion of new entrants to the Post Office service the first rung of the official ladder

is an appointment as telegraph messenger. The messengers are recruited between the ages of $13\frac{1}{2}$ and $14\frac{1}{2}$ through the Junior Employment Bureaux or the Junior Advisory Committees. The Department makes a point of seeing that their education after joining the Post Office service is not abruptly terminated, and it is a condition of their employment that for about two years they attend Day Continuation School classes for at least four hours per week. At one time a considerable number of boys were discharged when their service as messengers came to an end, and the Post Office laid itself open to the charge of encouraging a blind alley occupation. Largely through the instrumentality of a Committee which sat in 1910, the annual inflow of messengers was reduced and the number of adult appointments available for ex-messengers was increased, so that it is now possible to give each boy a pledge, subject to good conduct, of permanent employment in the Department. On reaching the age of 16 he can enter for a limited competition, the result of which will determine the class to which he is permanently assigned. Successful candidates in order of merit are given a choice, and those at the top of the list generally elect for appointment to the indoor staff or to the engineering department, and the residue in due course become postmen.

The largest single grade in the Post Office service is the postmen, who number over fifty thousand. The Department is under a pledge to reserve not less than half of the vacancies for postmen throughout the country to ex-Service men who are recruited

in the provinces through the Employment Exchanges, and in London through the National Association for the Employment of ex-Soldiers, Sailors and Airmen. In practice, all postmen's vacancies are given to ex-Service men, except those which are required to provide for boy messengers when they reach adult age. The postman has an outlet through a limited competition for promotion to the class of sorters or, in the provinces, sorting clerks and telegraphists.

The indoor staff, as it is commonly called, consists of those principally engaged upon the sorting of correspondence, the transmission of telegrams and the counter work at post offices. In London these duties are divided functionally among three classes, known as sorters, telegraphists, and counter clerks and telegraphists. In the provinces they are in the hands of a single amalgamated class designated sorting clerks and telegraphists. Their avenue of promotion is either into the supervising grades or through a limited competition to the clerical classes.

Many sections of Post Office work are peculiarly suitable to women, and large numbers are employed as telegraphists, telephonists, at post office counters and in the clerical departments. In fact the Post Office was the pioneer of the employment of women in the Government service. In accordance with the ordinary Civil Service rule a woman is required to resign on marriage; in consequence the normal wastage among the female staff is much higher than among the male, and on the average a woman renders shorter service in return for her original

training. In telephone operating the woman is generally held to be superior to the man, and in some other branches of Post Office work her output is not appreciably inferior. The female staff of the Post Office is not employed upon night duties, and in the telephone exchanges and the largest telegraph offices, which are open through the night, the women are relieved by men. In some of the Post Office departments the female staff is segregated under its own female supervising officers, but in others men and women are regarded as interchangeable for most of the duties. In recent years there has been a tendency to allot superior responsibility to women more readily than in the past.

The administration of the Post Office entails an immense amount of clerical labour, ranging from large blocks of purely routine work, such as the keeping of savings bank and other accounts, to highly responsible and difficult duties. The clerical staff is organised on the basis of the so-called "Treasury classes," which are common to the Civil Service, with uniform scales of pay and conditions of service. It is recruited principally from the open competitions conducted by the Civil Service Commissioners, but a proportion of vacancies is reserved for limited competitions among candidates from the Post Office manipulative grades. It is satisfactory to find that on the average the product of the limited competitions is considered to be not inferior in quality to that of the open competitions.

An essential part of the Post Office machine is the sub-office, as it is called in Post Office termin-

ology. The sub-postmaster or sub-postmistress—for large numbers of these offices are in the hands of women—combines the rôle of a Post Office employee with that of a Post Office contractor. In return for an annual payment by the Department, graduated according to the amount of business transacted at his office, he provides the building free of charge and defrays rates, taxes and all other outgoings, he appoints and pays any assistants who may be required, and he is generally responsible for the conduct of the office. The assistants are thus the servants of the sub-postmaster and not of the Postmaster-General. In some of the larger sub-offices a considerable number are employed, in others the sub-postmaster carries on with such help as his family can give him. He is not required to give personal service and, provided the office is efficiently conducted, it is immaterial to the Department whether the sub-postmaster attends in person or not. Usually the sub-office is combined with a shop and it brings grist to the mill in the form of the post office emoluments, often with little or no extra expense. The existence of the post office under the same roof as the shop also attracts custom to the latter and the appointments are usually keenly sought after. In the smaller villages the post office probably entails no more than an hour's work a day, and without the sub-office system and the combination of post office and shop it would be impossible, except at prohibitive cost, to supply the country villages with post offices on the liberal scale which they now enjoy.

The engineering department employs a total

staff of over thirty-three thousand, of whom twenty-seven thousand are workmen and the remainder are clerks, draughtsmen and superior grades. The rank and file staff is recruited partly by the selection of ex-Service men, e.g. ex-Royal Engineers, and other men from outside the Service, who normally start as labourers with a prospect of advancement to the grade of skilled workman, and partly through the class of youth-in-training. The youths are selected either from applicants who have had a secondary school education or technical training of equivalent standard, or from Post Office messengers who show a definite bent towards engineering. As soon after the age of 20 as they have acquired the necessary technical knowledge and skill, the youths are regraded as skilled workmen as vacancies become available, and they are then eligible for promotion in due course to the higher ranks of the engineering department. The higher ranks are filled partly by promotion from below and partly by open and limited competitions for appointments as inspectors and assistant engineers. The object of these competitions is to attract the most promising talent both from inside the engineering department and from technical colleges and universities. In the open competitions for assistant engineers and inspectors the standards of the examinations are designed to approximate to the final and intermediate examinations for an engineering degree. A youth of capacity who is prepared to give time to study can secure more rapid advancement through these competitions than by awaiting his turn for promotion. Above the grade of assistant engineer,

advancement is entirely by promotion, regard being paid to any special qualifications which the higher post may require.

Associations of Post Office servants have been in existence for many years, but it was not until 1899, when the Duke of Norfolk as Postmaster-General offered to consider on certain conditions representations submitted by the Postmen's Federation or any similar body, that the associations acquired any official status in relation to the Department. Mr. Sydney Buxton (now Earl Buxton), on becoming Postmaster-General in 1906, opened the door considerably wider and announced that he would "frankly recognise any duly constituted association or federation of postal servants" and would receive representations "from the members or representatives of the associations if they be in the service, or through its secretary (whether he be a member of the service or not) on matters relating to the service as a whole or on matters affecting the class or classes of servants of which the association is representative." This declaration of policy brought into existence a large number of associations representing almost every Post Office class, large and small, and the number of memorials attained embarrassing dimensions. But in recent years, partly owing to the amalgamation of the smaller classes with the large, and partly owing to a tendency of the separate associations to be absorbed into larger unions or federations, the recognised bodies have been reduced to relatively small numbers. It is and has been the practice of the Department to grant recognition freely, but if a rival association claims to represent

a class for which a recognised association already exists, it is required to show that it has a substantial following.

The establishment of Whitley Councils in the Civil Service in 1920 marked an important new departure. The Post Office has two Departmental Whitley Councils, the one representing the manipulative and clerical staffs and the other the grades included in the engineering and stores departments; and there is a network of office committees, subordinate to the main Councils, in the sub-departments of the Post Office, the head post offices and the local engineering offices. Broadly speaking, the Office Committee is only competent to discuss matters which concern that particular office; questions affecting the Post Office service as a whole, or more than one of its establishments, are within the purview of the Departmental Councils, while questions affecting other Departments of State, as well as the Post Office, are referred to the National Civil Service Whitley Council. The Whitley Councils provide formal and regularised machinery for discussing matters affecting the staff or their conditions of service. For smooth and effective working the office committees necessarily depend upon the tact and personal qualities of the local representatives on both sides of the table; in general, they have been a pronounced success, and in most offices the staff takes considerable interest in the discussions. The meetings of the Post Office Departmental Council are usually attended by some thirty or forty persons, and it is too large and unwieldy a body for the frequent

sessions and detailed discussions which many of the Post Office staff problems entail. It is the practice to remit the more complicated questions which come before the Councils to small sub-committees, generally with very successful results. Sometimes differences of opinion prove irreconcilable, and the committee's report is confined to a record of divergent views, but more often a solution acceptable to both parties has been found. The Whitley procedure has not superseded or curtailed the liberty of individual associations to make representations through the ordinary channels to the Postmaster-General, and discussions are constantly in progress between the Secretariat and the headquarters offices of the various associations, and between postmasters and their local representatives. In fact, the Whitley machinery has synchronised with and probably been responsible for the substitution of personal discussion for the voluminous and inconclusive correspondence of an earlier day. This is a step forward which is never likely to be retraced, and whatever modifications the Whitley machinery may undergo in the process of time, its main principles are likely to remain unshaken.

Chapter XIII

THE POST OFFICE AND THE WAR

THE function of the Post Office in time of war is first and foremost to provide adequate and efficient communications to meet military and national requirements, and secondly to maintain as best it can its regular services for the civil population. Within the area of operations all forms of communication are of course entirely under military control, but in Great Britain the Post Office was responsible not only for the ordinary postal services and the telegraph and telephone systems, which had to carry the immense traffic between naval and military centres, munition establishments and the London headquarters departments, but also for the special systems of communication which were essential to aerial defence, anti-submarine and other special war services. It also fell to the Post Office to keep in repair, and when necessary to add to, the cross-Channel cables upon which the communications with the Armies in France depended.

One of the first problems was that of personnel, and as the war dragged on it became daily more acute. In the first month, some 20,000 Post Office servants, Reservists and Territorials, were called to the Colours and silently disappeared. They formed the vanguard of what ultimately became

an army in itself; from first to last upwards of 83,000 men joined the forces from the Post Office staff, of whom nearly 8,500 laid down their lives. 1,700 attained commissioned rank, and among the imposing record of honours were four Victoria Crosses, twenty-eight Distinguished Service Orders, 130 Military Crosses and over 1,500 other distinctions. For Queen Mary's Army Auxiliary Corps the female staff of the Department provided 700 volunteers, who took up duty as telegraphists and telephonists at the bases and on the lines of communication in France. The Post Office had a special interest in the Post Office Rifles (8th Battalion London Regiment), which maintained its character as a distinctive Post Office unit throughout the war; two battalions of the regiment proceeded to France and served with an honourable record through the campaign on the Western Front. The Army Post Office was recruited entirely, and the Army Signal Service very largely, from Post Office personnel.

At first substitutes for those who joined the Colours were obtainable without difficulty, but before long men of military age, other than medical rejects, were barred, and it became evident that the extensive use of female labour, combined with the curtailment of public facilities, offered the only solution. By a general reduction of collections and deliveries, the restriction of hours of business at local post offices, and a number of minor changes, considerable staff savings were realised, while the Department gained valuable experience as to the restrictions which caused serious inconvenience and

those which could be retained permanently under the pressure of post-war economy.

The employment of women was gradually extended, not without misgivings, to duties for which either from lack of experience or on grounds of physique women had previously been considered unsuitable. Each successful experiment led to others, and by the end of the war women were employed in large numbers both on day and night shifts as postwomen and on sorting duties, and even on work requiring considerable physical stamina, such as driving mail vans and repairing overhead telegraph wires.

During the whole of the war period the telephone service was working under severe pressure, which was intensified as the mobilisation of industry for war purposes progressed. The local service was maintained without serious difficulty, but the trunk wires were quite unable to carry the enormous load of Government priority calls in addition to the normal traffic, and heavy delays, from which the ordinary public were the chief sufferers, were the result. Some five hundred trunk circuits were appropriated exclusively for the fighting services, either for the whole twenty-four hours or in some instances from "dusk to dawn" only, but even so the calls originated by the War Office over the public wires averaged over sixteen thousand per day, and the Admiralty, Air Ministry and Ministry of Munitions accounted for many thousands more. The numerous schemes dealing with one aspect or another of home defence, and in particular the elaborate anti-aircraft organisation, demanded

special telephone lines and apparatus on a large scale; gun positions, fire observation posts, search-lights and many other defence equipments required direct communication with their local control positions and often with each other, while the local controls had direct lines to their headquarters in London or to the large provincial centres. The whole system was in fact a secondary telephone organisation, which involved a complicated network of telephone circuits over the eastern and southern counties extending from Scotland to the Isle of Wight, and as thirteen thousand men from the staff of the Post Office engineering department had joined the forces, the new construction was only carried out with great difficulty.

The telephone service was the pivot for the system of air raid warnings, originally confined to munition works and other establishments where special precautions were necessary, but later developed into a general warning to the public. The country was divided into a number of control areas. The issue of a warning to any area devolved upon G.H.Q. at the Horse Guards, acting upon the telephonic reports of impending attack from observer posts. The order to issue a warning was sent direct to the trunk exchange, whence it was telephoned to central exchanges in the areas specified and by them distributed to all local exchanges. Each local exchange was responsible for warning all telephone subscribers on a pre-arranged list. Speed was vital and the organisation eventually grew so perfect in detail that the distribution of a warning was completed in five to eight minutes

from the time it was issued. To distribute the warnings and to deal with urgent calls for the police, fire brigades, etc., a small staff had to be kept on duty at each exchange during the progress of a raid. Volunteers were invited, and throughout the country the response far exceeded the numbers required ; in London, for example, over 80 per cent. of the telephone staff gave in their names. There were many occasions when, on the issue of a warning, telephone girls, who were not on the rota for duty, made their way under great difficulties to their exchanges in case help might be required. As most of the exchanges are situated on top floors with glass roofs, the experience was necessarily alarming, and the way the service was carried on is a fine testimony to the courage and public spirit of this body of women workers.

In the years preceding the war, a careful investigation had been carried out by the Committee of Imperial Defence into the problems of Imperial communications in time of war and, in particular, into the use of wireless in the event of important cable routes being interrupted. The construction of the Imperial chain of wireless stations had been begun, but had not proceeded far when war was declared. As events turned out, the Allied command of the sea secured to the cables singular immunity from hostile interference ; the Eastern Company's station at Cocos Island and the Pacific cable at Fanning Island were attacked, but the damage inflicted was trifling and was easily repaired.

The Anglo-German telegraph service was closed down as a matter of course as soon as war was

declared. As the fatal hour approached, one after another of the German wires cleared their traffic and shut down, until only the Berlin wire remained ; just on the stroke of midnight the Berlin telegraphist passed the signal "G.N.," the telegraphic abbreviation for "Good night," and for five years telegraphic communication with Germany ceased. Next morning the Anglo-German cables were cut by the Post Office engineers below low-water mark as a precaution against illicit use, and one of the Post Office cable ships, which had been held in readiness at Dover, proceeded to sea and cut the five German cables passing down the Channel to Brest, Vigo, Teneriffe and New York. Thenceforward direct cable communication between Germany and the outside world was severed and the Germans had to rely mainly on their wireless stations.

The cross-Channel cables were a constant source of anxiety ; most of them were concentrated in a very restricted area in the Straits of Dover and, owing to the operations of minesweepers and the dragging of ships' anchors, were subject to incessant interruptions. At the same time, concurrently with the expansion of the British armies and naval establishments in France, the Government telegraph and telephone traffic was rising month by month, and demands were continually coming in for the appropriation of wires for the Air Service and other special purposes, for which instantaneous communication at any moment was required. By the end of the war the Post Office had provided ten new cables, telegraph and telephone, across the Channel, some of them being made up of portions

of the derelict German cables which were either picked up and relaid or used *in situ*. In addition to the laying of new cables across the Channel and to Russia and the diversion of the German-New York cables referred to in a previous chapter, the cables ships carried out nearly three hundred repairs. One of the Post Office ships was sunk by a mine in 1915, and on two occasions the cable grapnel hooked and brought a mine to the surface without exploding it.

The insistent calls for skilled telegraphists for the armies abroad and for military and naval stations at home made the staffing of the telegraph service almost a nightmare; in spite of permanent overtime and various expedients for reducing the need for skilled operators, such as the systematic telephoning of telegrams, the available staff was at times almost snowed under and the quality of the service inevitably deteriorated. Government telegrams, which averaged about six hundred thousand a year in 1913, reached nearly eleven millions in 1917-18; as this heavy load carried priority, it still further increased the delays on private messages.

There was one dramatic interruption of the service when a bomb dropped on the Central Telegraph Office during a daylight air raid in July, 1917, and brought down a portion of the roof. For a few hours the whole of the services, inland and international, were at a standstill; the international wires were reopened the same afternoon, Birmingham was used temporarily as the main centre of the inland service, and within three days normal working at the Central Telegraph

Office had been resumed. There were no casualties in the office, as the top floor had fortunately been cleared when the alarm was given, and the episode afforded a reassuring test of the elasticity of the service in time of emergency.

As a contrast another interruption is worthy of record. When the Central Telegraph Office war memorial was unveiled, the various telegraph administrations were notified of the exact time of unveiling and agreed to stop the telegraph service for ten minutes as a tribute of respect. The intimation, probably from feelings of delicacy, was not passed formally to Germany, but the German administration without comment closed their wires for the same period. Thus the men of the Central Telegraph Office who laid down their lives in the war received the singular professional tribute that for a few minutes practically the whole of the telegraphs of Europe were silent at the unveiling of their memorial.

As soon as war was declared the foreign mail services began to feel the effects of the dislocation of shipping, and as more and more vessels were chartered by the Government for transport and supply duties, or were diverted from their regular routes to others where tonnage requirements were more urgent, the difficulties in finding mail outlets became intensified. In the later stages of the war few regular services were maintained, and the best the Post Office could do was to obtain the latest information as to prospective sailings, whether of British or foreign vessels, and to ship on them any mails available. Even so sailings were often cancelled

or postponed at the last minute, and on some occasions ships were detained in port with the mails on board for considerable periods owing to submarine activity. It was noticed that allied and neutral countries paid us the embarrassing compliment of sending a far greater proportion of their foreign mails to England for onward transit than in time of peace.

The historic Brindisi route for the Indian mail was abandoned immediately war broke out; some months later an overland service via Dieppe and Marseilles was organised, but this was suppressed in 1917, and thereafter the Eastern mails had to be dispatched from England by the all-sea route. The Orient liners, which conveyed the Australian mails in alternate weeks with the P. & O., were diverted to other routes in 1916, and the P. & O. ceased to serve Australia in 1917; after that the Australian mails, together with those for Japan and Northern China, were sent by Vancouver or San Francisco, and the Indian mail became a fortnightly instead of a weekly service.

A considerable number of mails were lost by enemy action at sea, and when the convoy system was started, an attempt was made to spread the risk by dividing the mails, when practicable, among several ships in the same convoy. A scheme was also introduced under which important letters could be sent in duplicate or triplicate, the Post Office guaranteeing that each copy would be dispatched by a different ship. These special arrangements added complications to an already complex organisation, but the additional security

which they provided was well worth the trouble involved.

The boldest prophet could hardly have foreseen in August, 1914, the dimensions which the Army and Navy mails were destined to reach. Beginning as a gentle stream, which was no more than an incident in the normal routine of the Post Office, within two years they had grown into a deluge that at times, and especially in the weeks preceding Christmas, threatened to overwhelm the depleted resources of the Department. The value of a regular and rapid postal service to the *morale* of the forces was soon recognised, and the success achieved was largely due to the whole-hearted assistance provided by the military and naval authorities, both afloat and ashore.

In the theatres of war, the Army mails were entirely in the charge of the Army Post Office, known officially to the Army List as the Royal Engineers (Postal Section), the personnel of which was entirely drawn from the Post Office staff. The Army Post Office first saw service in the Egyptian campaign of 1882, and on a larger scale in South Africa. At the outbreak of war its establishment consisted of three hundred men, who were immediately despatched to France with the British Expeditionary Force, a small nucleus being retained to form a *Depôt* at home. As new expeditions were fitted out, fresh branches were formed for the Dardanelles, Egypt, East Africa, Salonica, Italy and North Russia, and eventually the personnel serving overseas reached nearly four thousand men.

The work and experience of the Army Post Office

and its various detachments would fill a volume in itself; suffice it here to say that from the time the mails were disembarked abroad it was responsible for handling, transport and distribution until the mail for each unit was handed over to its post orderly, wherever the unit might be stationed. The Army Post Office collected and embarked the mails for home; it established a system of cross-posts for correspondence passing between one unit and another of the same force, and it set up and staffed a network of field post offices which undertook many of the subsidiary Post Office services; postal orders and money orders were issued and cashed at the current rate of exchange in half a dozen different currencies, letters were registered, savings bank deposits and subscriptions to War Loans and Savings Certificates were accepted, and at least one dog licence is said to have been issued.

The Home Dépôt of the Army Post Office fulfilled two functions; it provided the proper complement of personnel for new expeditionary forces and for new divisions as they proceeded overseas, and it served as a central sorting office for all outward mails for the armies abroad. Beginning with a force of thirty men, it gradually expanded to a total of 2,500, of whom nearly 1,200 were women. As the new armies took the field, the Home Dépôt quickly outgrew the various Post Office premises in which it was originally housed, and in 1915 a temporary building was put up in Regent's Park covering five acres of ground and possessing some two hundred thousand square feet of floor space,

which was devoted to the sorting of Army parcels until the end of the war.

For the first few months the mails were dispatched abroad in bulk and most of the sorting was carried out at the base post offices in France. But it was soon realised that staff and sorting accommodation could be provided more easily at home, and "unit sorting" was introduced at the Home Dépôt. Under this system separate bags for letters and parcels were made up daily for every unit, from an infantry battalion to a divisional shoemaker's shop or a field bakery, and were dispatched to the port from which the unit was served, duly labelled for the proper railhead or stationary post office according to daily location lists supplied by the War Office or the Army Post Office abroad. From the railheads the mails were conveyed by motor transport to the point where they were handed over to the unit post orderlies; the letters for the men in the trenches were usually taken up at night by the ration parties, who brought away the letters for post. Later on it was found necessary to ease the position at the Home Dépôt by decentralisation, and a considerable proportion of the sorting was transferred to the large provincial post offices, which dispatched bags by rail direct to Folkestone and Southampton for shipment to France. When the armies abroad were at their maximum strength, the outward mail consisted of about twelve million letters and one million parcels weekly, and at Christmas the bulk was much larger. In the four weeks preceding Christmas, 1916, nearly $4\frac{3}{4}$ million parcels were dispatched to France alone.

The rapidity of the service depended mainly upon the transport conditions. In France, especially during the era of trench warfare, a regular organised transport system was available and a quick service became the rule; over a large section of the line the morning newspapers were obtainable on the day of issue. The Dardanelles expedition presented almost insuperable difficulties; the mails were dispatched via Port Said and Alexandria, whence they were conveyed by any available transport to Mudros; there they were relabelled and sent on by minesweepers, lighters or trawlers to one of the three "beaches," all of which were covered by Turkish gunfire; thence they were distributed, as and when possible, to the troops on the peninsula. The Salonican force was originally served via the Mediterranean, and mainly owing to delays due to submarine alarms letters took over a fortnight to reach their destination and parcels even longer; but later on an overland route via Cherbourg and Taranto was opened and the period of transit was much reduced. The Government of India was responsible for the East African and Mesopotamian expeditions; and the function of the British Post Office was confined to embarking the mails for Bombay and Dar-es-Salaam respectively. After reaching the ports of destination, the mails were entrusted to a strange variety of transport, ranging from travelling post offices on the Italian and Baghdad railways to a sleigh journey of four hundred miles round the shores of the White Sea; but whatever means were employed it was very rare in any of the theatres of war for a bag to be lost.

Unlike the Army mails, the mails for the Fleet were handled throughout by the civil Post Office. The public were told to address all letters and parcels for H.M. ships "c/o G.P.O., London," where they were sorted and dispatched to their destinations by a special section. Particulars of the changes of location of all ships, large and small, were furnished daily by the Admiralty, and elaborate precautions were taken by a special system of labelling to prevent leakage of information. The mails for ships in foreign waters were consigned to the senior naval officer, to the British Consul, or sometimes to shipping agents. At one time there were some seventeen thousand vessels on the mail lists, ranging from the battleships of the Grand Fleet to motor-boats and tramp steamers under charter to the Government. Identity and similarity of names were frequent sources of trouble, but on the whole the system worked smoothly and accurately and the complaints of loss or delay were singularly few.

The mails to and from prisoners of war proved a more troublesome business. Under the Hague Convention, prisoners of war are entitled to send and receive letters and parcels free of postage. Holland served as an intermediary for mails in both directions. Over five million parcels were received for German prisoners in England and distributed among the various internment camps, and twenty million parcels were dispatched to British prisoners abroad. The difference was probably due in part to the shortage of food and other commodities in Germany, and partly to the German practice of

making up their parcels in small packets which passed via the letter post. The prisoners' mails in both directions were carefully censored for prohibited articles. At a later stage the dispatch of parcels to British prisoners was concentrated in the hands of the Central Prisoners of War Committee and the regimental and other associations which were practically branches of it. This policy not only equalised the supplies as between different prisoners, which was one of its primary objects, but resulted in much better packing and the elimination of waste, and incidentally it enabled the censorship to be dispensed with and appreciably lightened the labours of the Post Office.

Like most other Government departments, the Post Office had thrust upon it a miscellaneous collection of war duties, many of which were quite foreign to its ordinary functions. Some of the best talent in the engineering department was engaged on the design of trench telephones and other electrical equipment for use in the field, and a section of the Post Office factories was diverted from the repair of telegraph instruments to the production of the delicate shell gauges required for munition factories. The payment of separation allowances and the issue of Government Loans and War Savings Certificates, which are referred to elsewhere, threw an immense load of work both upon the headquarter financial departments and upon the post offices throughout the country. To those who had to administer new services, the local post office seemed a heaven-sent medium for the dissemination of information, the distribution of forms and leaflets

and any other odd jobs which no one else could or would undertake. Many a sub-postmaster, whose activities before the war consisted mainly in retailing sweets and postage stamps, found himself expected to advise his customers upon everything from the respective merits of different Government investments to the legality of buying a rabbit without a meat coupon.

From this brief summary it will be realised that, extensive and complicated as are the normal operations of the Post Office in times of peace, during the war they became infinitely more so. And, when it is remembered that these additional burdens were shouldered with some measure of success by a staff which had been depleted by the enlistment of many thousands of its best units in the fighting forces, the Post Office feels entitled to look back on its war record with a certain satisfaction.

Chapter XIV

CONCLUSION

IN the foregoing chapters we have traced the evolution of the Post Office from a primitive organisation for carrying the Sovereign's despatches to a national institution in the widest sense of the word. We have seen its functions, originally confined to the conveyance of letters, gradually extended and amplified to include the telegraphs and telephones, wireless communication and the Savings Bank, besides a host of miscellaneous services. To-day in one connection or another the Post Office numbers practically the whole nation among its customers and its services extend to the most distant portions of the globe.

While the twentieth century cannot claim such conspicuous landmarks in Post Office history as the institution of penny postage or the invention of the electric telegraph, in spite of the upheaval of the Great War it has already no mean record of achievement to its credit. The science of wireless has emerged from the stage of experiment and within the last few years has yielded results which to a previous generation would have seemed fantastic. The automatic telephone, probably the most complex mechanism which human ingenuity has yet devised, has taken its place as a normal part of our telephone equipment. Aerial transport, though

still in its infancy, is building up a network of express services for urgent correspondence and has already brought London a day or more nearer many of the great cities of the Continent. A public telephone service has been opened between England and the United States of America, covering the whole of that great territory from New York to the Pacific Coast. And in many other directions in the field of communications less spectacular but no less valuable progress can be recorded.

Prophecy is a dangerous pastime, but it would not need an incorrigible optimist to predict that the next decade will prove as fertile as its predecessor. There is reason to expect that air transport will occupy an increasingly prominent place in Imperial and Continental communications. A regular air service between Cairo and India, connecting at Cairo with the mails to and from England, is shortly to be opened, and, if this meets with the success expected by its promoters, it may be the forerunner of air mails to Australia, South Africa and perhaps even to the Far East. And by means of branch services by air, rail or steamship or a combination of all three, the benefits of acceleration may be shared by a much wider territory than is covered by the trunk service itself. Aeroplane services over these great distances have many difficulties to surmount. The organisation, elaborate as it must necessarily be, is expensive to maintain, and success is dependent upon the amount of passenger and freight traffic which can be secured. Development is therefore slow, but it seems only a matter of time before regular and reliable through services

from England will be carrying urgent correspondence at a small fee to the most distant parts of the Empire. Hitherto the transport of air mails has been confined to the aeroplane; but a scheme is in preparation for establishing a network of long-distance services by airships of large carrying capacity, flying night and day. If an average speed of sixty miles per hour could be maintained, India could be reached in about a little over four days, South Africa in about five, and Australia in rather more than a week. A scheme with such ambitious aims would obviously take many years fully to materialise, but it may not be as visionary as at first sight it would appear. If and when it comes into being, the history of Imperial postal communication will have entered upon an entirely new phase, the results of which it is difficult even to attempt to forecast.

In the sphere of wireless the prospects for the future are equally promising. The successful opening of the Beam services to Canada and Australia has demonstrated that telegraphic communication can be maintained over great distances at a considerably lower cost than was thought possible a few years ago. It is true that the Beam system at present suffers from the drawback of intermittence and cannot be relied upon for more than a limited number of hours daily. But it will be strange if the advance of wireless science does not gradually reduce this handicap to the point when it can practically be ignored. The increased traffic capacity on some of the important routes, produced by the opening of wireless services

and the invention of the "loaded" submarine cable, has already had some effect in reducing rates, and the next few years are likely to see a definite movement in the direction of lower charges. The time when cabling was restricted on grounds of expense to messages of urgency and importance is rapidly disappearing, and before long the extension of the cheap tariffs for non-urgent traffic may enable the telegraph services to compete seriously for part of the business still carried by the mails.

Preliminary experiments to test the suitability of the Beam system for telephone purposes have already been carried out between England and Canada, and the results have been decidedly encouraging. These experiments will be continued systematically during the summer months, when atmospheric conditions are usually less favourable, by the Marconi Company, working in conjunction with the Post Office engineers, and it is hoped that they will eventually materialise in a public telephone service. But a word of warning is necessary; it is too often assumed that the transition from preliminary tests to a reliable service is short and easy, whereas in practice it is generally the reverse. Experience has shown that the gap between occasional conversations and regular communication of a commercial standard is a wide one, the bridging of which frequently involves a series of unexpected difficulties. If telephony by the Beam system proves a success, it opens out a vista of telephone services with the Dominions and distant foreign countries which

will form an appropriate counterpart to the expansion which is now taking place on the European system. The value of the telephone for international commerce is becoming daily more appreciated, and provided the service is of a quality to give easily intelligible conversation, the public are not deterred by relatively high charges.

Post Office business of all kinds, as the reader probably realises, is peculiarly sensitive to trade conditions. In spite of the industrial depression of the last few years, the telephone demand has kept up surprisingly well and postal traffic has shown a steady, if modest, increase. A growing volume of business gives the stimulus and provides the revenue for improvement of services, and the Post Office, in common with the great national industries, anxiously looks forward to a period of industrial peace and trade prosperity which would give a welcome impetus to its many activities.

During the war the speed and reliability of the Post Office services inevitably deteriorated, and in the period of reconstruction the restoration of the pre-war standard, obviously one of the most urgent problems facing the Department, proved to be an arduous task. The staff included an abnormal proportion of new recruits, and many of the men demobilised from the Army found it no easy matter to settle down to civil life and to recover their former skill. But as time passed these difficulties gradually disappeared. It is true that the restriction of the late evening collections and deliveries has slowed down the postal service in many provincial towns, but the statistical records which the

Department maintains of the various services show that, as a general rule, in accuracy and reliability they are not inferior to pre-war days. So long as the human element plays so large a part in the Post Office machine, mistakes will occur, and over the vast volume of business handled by the Department a minute percentage of error becomes in the aggregate a formidable figure. Considering the difficulties for which the public are, consciously or unconsciously, themselves responsible, such as the giving of incorrect telephone numbers, illegible handwriting and insufficient addresses, the failures are remarkably few. And the public can rest assured that no one is more alive than the Post Office staff to the importance of maintaining the high standard of accuracy with which their work is traditionally associated.

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